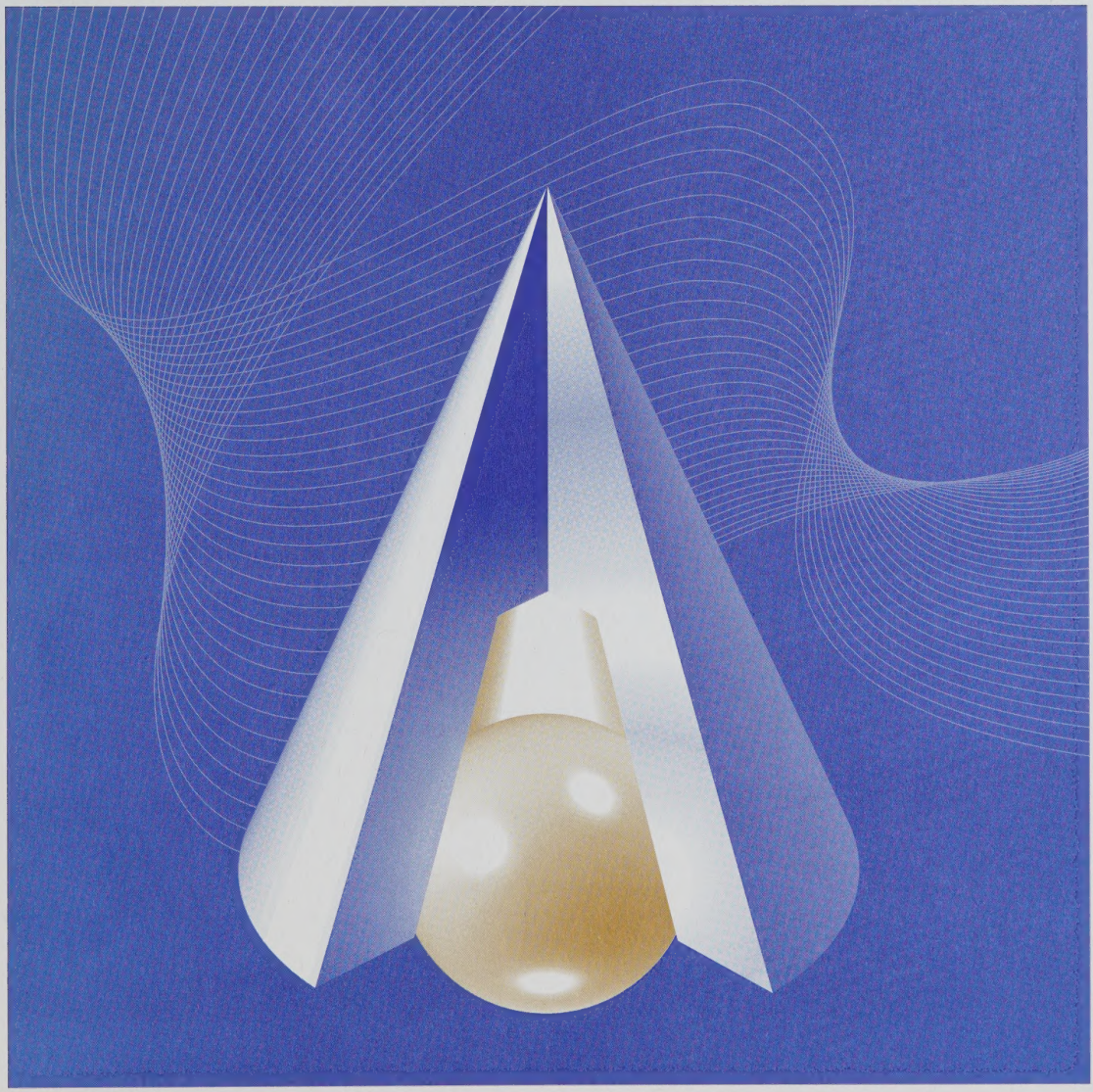
Research Paper Series

Analytical Studies

Who Goes? The Direct and Indirect Effects of Family Background on Access to Post-secondary Education

by Ross Finnie, Eric Lascelles and Arthur Sweetman

No. 237



Statistics Canada Statistique Canada

Canada

ANALYTICAL STUDIES
RESEARCH PAPER SERIES

The Analytical Studies Research Paper Series provides for the circulation, on a pre-publication basis, of research conducted by Branch staff, visiting Fellows and academic associates. The Research Paper Series is intended to stimulate discussion on a variety of topics including labour, business firm dynamics, pensions, agriculture, mortality, language, immigration, statistical computing and simulation. Readers of the series are encouraged to contact the authors with comments, criticisms and suggestions. A list of titles appears at the end of this document.

Papers in the series are distributed to Statistics Canada Regional Offices, provincial statistical focal points, research institutes, and specialty libraries. These papers can be downloaded from the Internet at *www.statcan.ca*.

Publications Review Committee
Analytical Studies, Statistics Canada
24th Floor, R.H. Coats Building
Ottawa, Ontario, K1A 0T6
(613) 951-1804

Who Goes? The Direct and Indirect Effects of Family Background on Access to Post-secondary Education

by Ross Finnie*, Eric Lascelles and Arthur Sweetman*****

11F0019 No. 237
ISSN: 1205-9153
ISBN: 0-662-39098-9

Business and Labour Market Analysis Division
24-F, R.H. Coats Building, Ottawa, ON K1A 0T6
* Statistics Canada
and
*School of Policy Studies at Queen's University
**Department of Economics at Queen's University
***School of Policy Studies at Queen's University

How to obtain more information:
National inquiries line: 1 800 263-1136
E-Mail inquiries: infostats@statcan.ca

January 2005

Ross Finnie is a Research Fellow and Adjunct Professor in the School of Policy Studies at Queen's University and a Visiting Fellow at Statistics Canada. Arthur Sweetman is an Associate Professor in the School of Policy Studies at Queen's University. Eric Lascelles was first a researcher at Statistics Canada and then a graduate student in the Department of Economics at Queen's when this work was undertaken. The authors are grateful to Christine Laporte for her participation in related work and to our colleagues at Statistics Canada and Queens University for comments. Financial support for Sweetman from SSHRC is gratefully acknowledged. The corresponding author is Arthur Sweetman, School of Policy Studies, Queen's University, Kingston, ON, K7L 3N6, telephone: 613-533-6555, email: sweetman@post.queensu.ca

Aussi disponible en français

Table of Contents

ABSTRACT

This research finds that family background (parental education level, family type, ethnicity, location) has important direct and indirect effects on post-secondary participation. The indirect effects of background operate through a set of intermediate variables representing high school outcomes and related attitudes and behaviours. Overall, the large fraction of the family background effect that operates through indirect channels indicates that the period of life before post-secondary financing and related issues become important is crucial for equitable and efficient post-secondary access. These results are based on two sex-specific measures of access (Any Post-secondary, and University) obtained from Statistics Canada's School Leavers and Follow-Up Surveys.

Keywords: post-secondary education, higher education, access to college and university.

I. Introduction

Access to post-secondary education is an important policy issue for two principal reasons. At the individual level, advanced schooling is a critical determinant of individuals' career and economic success, and at the societal level, it is fundamental to the nation's economic performance. "Who goes", therefore, impacts economic efficiency, but individual access, or lack of access, also has substantial equity implications. The twin issues of social justice and economic efficiency comprise a potent policy context for discussions of access to post-secondary education and the role of family background in this dynamic.

Much of the current Canadian debate regarding access to post-secondary education focuses on tuition levels and student financial aid; this, typically, follows from the assumption that affordability is an important barrier to access and that family background operates largely through this factor. As will be discussed, there is an emerging body of evidence suggesting that affordability may not currently be the principal reason that individuals do not go on to post-secondary education, and that family background—while very important to access—operates more through factors other than financial ones, although post-graduation student debt is clearly impacted by financing.

Most studies of family background include a limited number of basic characteristics such as family income, parental education, family type, and place of residence. These studies provide important information regarding the overall degree to which these factors affect post-secondary access, but they do not tell us how these factors operate, or what other factors are important. Does parental education, for example, serve chiefly to improve individuals' performance in high school and otherwise prepare them for college or university, or does it affect participation after controlling for such factors (e.g., through financing or an understanding of the benefits of higher schooling)? Or is it some combination of the two? As far as we are aware, no research using Canadian data considers the direct and indirect mechanisms by which background variables operate.

In this paper, we attempt to address these broader issues using Statistics Canada's School Leavers Survey, which is uniquely rich in background information including high school and related outcomes. We seek to identify the relative importance of pre-postsecondary intermediate outcomes in mediating background factors to affect post-secondary participation. Family background characteristics include parental education, family type, place of residence, language, and ethnicity. Pre-postsecondary intermediate outcomes and attitudes include elementary school success, high school academic outcomes, school-related behaviour, attitudes towards school of the individual, the students' peer group and parents, and outside work during school.

We exploit these data by employing a block recursive approach which consists of first including only our set of background personal and family characteristics in the model, then adding the set of high-school and related "intermediate" variables, so-named because they occur subsequent to the family background variables and lie (chronologically) "between" these and the final outcome of interest (i.e., access). Our first ("short") model thus identifies the total effects of our measures of family background on post-secondary participation in a manner comparable to other analyses of this type. Our second ("long") model then gives a more complete view of the various determinants of post-secondary participation, including the effects of family background once the other intermediate factors are taken into account. Thus, the long regression allows us to see the

effect of each regressor that is independent of the effects of the other regressors. Finally, comparing the coefficients on the family background variables in the two models allows us to break the total effects of the family background characteristics into those that operate through individuals' observed high school outcomes and the other intermediate outcomes, and those that operate directly, after taking those other influences into account. We round out the recursive model approach by showing how some of the intermediate outcomes, such as high school grades, are themselves determined by family background.

This exercise is carried out for men and women for two different outcomes: i) post-secondary participation at any level, from trade school through community college up to and including university, and ii) university participation only. We find, first of all, that family background is an important determinant of post-secondary access. We also find, however, that many of the intermediate outcomes have substantial effects on post-secondary participation and, further, that the family background effects are significantly attenuated when these variables are added. Otherwise put, our results indicate that a substantial portion of the family background effects operate through their influence on other pre-postsecondary factors, such as high school marks, attitudes towards higher schooling, the propensity to work while in high school, and so on. Not surprisingly, the findings are stronger for university attendance than the broader post-secondary participation measure.

II. The literature

Government policy involving access to post-secondary is frequently associated with the idea that liquidity constraints are a major barrier to post-secondary access and loans and grants programs are seen as a response, although reducing student debt is sometimes seen as a goal of such programs in its own right. The existing Canadian research is surveyed by Looker (2001), and Junor and Usher (2002) paint a broader portrait of the current post-secondary education system that includes a significant discussion of access issues. However, a large literature, sometimes said to follow from the Coleman Report (1966) for the U.S., points to the importance of family background in predicting educational outcomes. Haveman and Wolfe (1995) review the U.S. literature on children's attainment, which clearly shows that family background starts to influence educational and related outcomes well before the transition to post-secondary. This is also a well established empirical finding in the Canadian literature and recent work by, for example, Ma and Klinger (2000), and Willms (1999), find that (socio-economic status) SES is a key determinant of outcomes in high school. It is difficult to disentangle the effect of SES that operates directly on post-secondary access, perhaps through financing, and that part that occurs regardless of financing.

Recently, a distinction has been forcefully made in considering the relevance of family wealth or income on post-secondary access by Carneiro and Heckman (2002), and Cameron and Taber (2004). They point out that even if a correlation between financial resources and access is observed, it is not synonymous with causation because SES is also highly correlated with early school achievement and it is not clear what mechanism is causing the observed correlation. Using indirect methods, since individual credit constraints and returns to education cannot be observed, they argue that, in the U.S., there is little evidence that borrowing costs hamper access. This is not to say that students do not accumulate debt, or that the current level of support is not

required, but that the current environment is such that financing is not a key issue on the margin. These results are, of course, controversial, and the models employed define post-secondary access as being restricted only if not attending implies a reduction in lifetime earnings. That is, access is not taken to be hampered if, for the marginal person, it is not a good economic investment. Kane (2001) disputes these findings by showing differences in post-secondary enrolment rates across family income quartiles, even when test scores, high school grades and parental education are held constant. Dynarski (2002), and Heller (1997) focus on the effects of price and student aid on access.

Some Canadian evidence in accord with the argument that financing is not crucial comes from work by Christofides, Cirello, and Hoy (2001) which finds that tuition fees do not seem to affect the pattern of post-secondary participation by social background. These ideas imply a reinterpretation of claims by students reported in, for example, Foley (2001) that educational costs *are* a major deterrent to their pursuit of post-secondary education. Student claims that high costs are preventing their attendance can also be taken to imply their expected personal low economic rates of return to education, and, therefore, for these students it is not a good investment. Of course, this interpretation ignores non-economic rationales for pursuing higher education.

A different, but starker, finding follows from a number of recent studies focussing on financial issues. They suggest that family income is no longer a crucial, or at least is a declining, determinant of post-secondary access in Canada. Corak, Lipps, and Zhao (2003) report that although individuals from higher income families are significantly more likely to attend university (although not college) in recent decades, the participation gap between high- and low-income families narrowed substantially through the early- and mid-1990's until 1997, at which point their data stop. The authors suggest that this convergence may be explained by an increased take-up in student loans over this period. Zhao and De Broucker (2001, 2002) report relatively small differences in participation by family income when all levels of post-secondary education are considered, but much larger gaps when just university attainment is considered. Finnie and Laporte (2004) use the recently available Post-secondary Education Participation Survey to find essentially no difference in participation rates by family income level, but large differences with respect to parental education, although the former finding is tempered by sample issues which also characterize some of the other papers on this subject (i.e., family income is measured for only individuals classified as living "at home").

Turning to more specific Canadian studies, Butlin (1999) uses the School Leavers Survey and identifies a wide range of simple correlations between post-secondary education, family background, and high school outcomes. De Broucker and Lavallée (1998a) use the International Adult Literacy Survey (IALS) to examine whether parental education affects child outcomes. They find that "inherited intellectual capital" has a strong effect; that is to say, higher parental education tends to result in higher education levels in children. Using the School Leavers Survey (1998b), they find that parents' occupation and the degree to which they support the education of their children are significant influences on educational attainment. Knighton and Mirza (2002) show, using the Survey of Labour and Income Dynamics (SLID), that both parental education and family income are significant determinants of post-secondary participation, but that parental education has a larger effect.

When broader background indicators are employed, however, a different picture emerges. Bouchard and Zhao (2000) compare changes in university participation rates over time using the General Social Survey (GSS) from 1986 and 1994. They find that participation rates increased for all levels of SES (socio-economic status), but climbed the most for those in the middle rank, less for those at the top, and least for those at the bottom – thus twisting comparative rates in an uneven pattern across family types. The changes are, however, complicated by whether one focuses on absolute or relative gaps, and the comparisons tempered by smallish sample sizes and the data for the two periods not being perfectly comparable. Finnie, Laporte and Lascelles (2004) use the School Leavers Survey in 1991 and the Youth in Transition Survey in 2000, and employ parental education as the background indicator. They report that the participation gap, as measured by parental education, generally widened over this period, especially at the university level. This change was driven principally by significant increases in post-secondary participation for those with university-educated parents. Frenette (2002, 2003), also using the SLID, investigates distance-to-school effects, and determines that post-secondary participation rates, especially for university, are strongly influenced by the distance an individual lives from a post-secondary institution, particularly for low-income students for whom the associated financial barriers would presumably be more pertinent.

That SES affects access is not in dispute, but the mechanism is the subject of heated debate. We contribute to this literature by focusing on the importance of family background's effects on intermediate variables, which in turn influence access. This broader model of post-secondary participation for Canada identifies a wider set of influences, and disentangles the direct, which includes financing, and indirect effects of family background.

III. The model

We model the relationship between family background and the other factors that affect post-secondary participation with the following set of equations:

$$x_{2i} = F_{1i}(x_1, e_1) \qquad (1)$$

and

$$y = F_2(x_2, x_1, e_2) = F_2\left(\sum F_{1i}(x_1, e_1), x_1, e_2\right) \qquad (2).$$

Equation 1 represents the relationship between a set of intermediate variables, x_{2i} (e.g., high school outcomes – subscript i indexes the set of intermediate variables) and a vector of background variables, x_1 (parental education, etc.). The second equation formalizes the notion that since both the family background variables (x_1) and the intermediate variables (x_2) affect post-secondary access (y), and the background variables also affect the intermediate variables, the background variables operate in two ways on access: indirectly (through the intermediate variables), and directly (after the intermediate variables and other factors are taken into account). The e's represent unobserved variables and idiosyncratic shocks affecting the dependent variable (i.e., stochastic error terms).

The key distinction between the background and intermediate variables is that, chronologically, the background variables occur first (i.e., they are pre-determined) and influence the intermediate

variables, while the reverse is not true, and, in turn, they both influence the final outcome—post-secondary attendance. This permits us to use a block recursive estimation strategy (see, for example, Greene (2003) pp. 383 and 411).

Since there is a common dependent variable and common regressors, ordinary least squares (OLS) coefficients on the background variables for this recursive model have the property:

$$\textit{Direct Effect} + \textit{Indirect Effect} = \textit{Total Effect} \qquad (3),$$

which follows from the linearity of OLS.[1] For the results presented below, we rely heavily on this simple relationship.

Assuming a single intermediate variable to simplify the notation, the empirical model can be written in OLS form as:

$$\text{Intermediate:} \quad x_2 = \alpha_0 + \alpha_1 x_1 + e_1 \qquad (4)$$

$$\text{Direct:} \quad y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + e_2 \qquad (5).$$

Substituting equation (4) into (5):

$$y = \beta_0 + \beta_1 x_1 + \beta_2(\alpha_0 + \alpha_1 x_1 + e_1) + e_2 \qquad (6)$$

$$= (\beta_0 + \beta_2\alpha_0) + (\beta_1 + \beta_2\alpha_1)x_1 + (\beta_2 e_1 + e_2) \qquad (7)$$

$$\text{Total:} \quad = \gamma_0 + \gamma_1 x_1 + e_3 \qquad (8)$$

where α represents the parameters in the intermediate equation, β represents the direct effects, and γ represents the total effects.

Intermediate effects regressions are estimated initially (one for each element of the vector x_2), and selected sets of estimates are presented to provide some insight into the relationship between the background and intermediate variables. However, for OLS there is no need to actually estimate the intermediate relationships to obtain the indirect effects of the background variables on the final outcome, or to compare these to the total effects. Instead, only equations 5 and 8 are estimated, and the indirect effects are obtained by subtracting. Restating equation 3 using our OLS notation,

1. While we have a dichotomous dependent variable, and probit (or logit) models are often considered to be superior when dealing with such outcomes, we elect to use OLS estimation. Moffitt (1999) makes a convincing argument that OLS is, in fact, the preferred specification when one is interested in obtaining coefficient estimates, as opposed to predictions, because probit and logit models are more prone to misspecification and are inconsistent in the presence of heteroskedasticity, whereas OLS is more robust. Furthermore, the non-linear models do not have the (exact) "adding-up" property with respect to direct and indirect effects depended upon here. Although we do not present the results, the direct effect regressions were estimated using probits, and in general, the results were very similar to those shown here.

$$\beta_1 + Indirect = \gamma_1 \quad (9)$$

$$\therefore Indirect = \gamma_1 - \beta_1 \quad (10).$$

Standard errors for the indirect effect are obtained by bootstrapping the difference between the direct and intermediate regressions' coefficients.

Note that the indirect effect can also be expressed as

$$Indirect = \beta_2\alpha_1 + \beta_1 - \beta_1 = \beta_2\alpha_1 \quad (11).$$

This has a simple intuitively appealing interpretation: the background variables impact the final outcome (post-secondary access) through the intermediate variables inasmuch as they affect the intermediate variables (i.e., α_1) and the intermediate variables subsequently impact the final outcomes (i.e., β_2). It is worth pointing out that the direct effect of the background variables estimated using this approach should be interpreted as an upper bound on the "true" background effect if there exists at least one independently relevant intermediate variable (x_2) that is omitted from the specification and is also correlated with the background variables. Adding intermediate variables that are caused by the background variables, and in turn influence access in ways not accounted for by the other intermediate variables will reduce the direct effect. Note also that the intermediate variables do more than mediate the background variables. The intermediate realization, on average, matters for the subsequent access. Note also that there exist background variables (e.g., parents' income is not measured in our data set) that are omitted. Inasmuch as these are correlated with the included background variables, the estimated coefficients will be affected (e.g., omitting parents' income may make education appear more influential).

IV. Data

We use Statistics Canada's 1991 School Leavers Survey (SLS) and 1995 School Leavers Follow-up Survey (SLFS). The SLS was conducted between April and June of 1991 among youth aged 18 to 20 years old. Its main objectives were to determine high school dropout rates in Canada and to compare three categories of secondary school students: those still attending, successful completers, and drop-outs. The SLFS, conducted between September and December 1995 among the same young people, then aged 22 to 24, was aimed at education, training, and labour market experiences beyond high school.

The SLS sampling frame was based on five years (1986 to 1990) of Family Allowance files, believed to provide the most complete listing of youth under 15 in Canada. An initial sample of 18,000 individuals was selected, of which 10,792 were traceable and 9,460 were interviewed. For the SLFS, 6,284 individuals were located and completed the second interview.[2] These surveys represent a unique source of information on the transition from secondary to post-secondary

2. See Appendix A of *Leaving School* for the SLS, and Appendix A of *High School May Not be Enough* for the SLFS for information on the weighting methodology. All the results reported here reflect the sample weights meant to make the sample representative of the underlying population.

education in Canada.[3] The original SLS contains the background information which generates the explanatory variables used in our models, while the follow-up allows us to identify which individuals have gone on to post-secondary education, and if so, at what level.

The two dependent variables used in this analysis are indicators of i) Any Post-secondary education, consisting of those who enrolled in a trade-vocational, college, or university program, and i) University Attendance, consisting of those who enrolled in a bachelor's, graduate or professional program at that level. We thus look at a wider definition of access, and then a more restricted definition.[4] It might be expected that family background would play a more significant role in access to university than for the more comprehensive measure, which includes courses as short as a few months, available at a much greater number of institutions across the country, and at lower cost. Comparing results across the two models allows us to detect such differences. These variables indicate *participation* at the indicated level, the usual definition of access in the literature. This treatment also best suits the data, since continuing in a program and completion are separate issues which would require following individuals over time in a manner for which the SLS and SLFS are less appropriate. The age range of the respondents (all 22, 23 or 24 years old at the second survey date) means that they have had a reasonable opportunity to start post-secondary schooling, but avoids the problem of individuals still being in secondary school, which arises when more youthful samples are employed.[5]

Table 1 reports the complete set of variables used in the regression analysis. It includes as comprehensive a list of factors that might affect post-secondary participation as possible.[6] The key background variable is parental education.[7] Except where otherwise stated, we employ a combined parental education indicator representing the maximum of the father's and mother's education (where both are present, otherwise we use the education of the single parent), instead

3. Statistics Canada's Youth in Transition Survey (YITS) will eventually offer new data of this type, but it does not yet follow respondents long enough to have had a full opportunity to pursue post-secondary studies (i.e., individuals are but 18-20 years old in the older wave).

4. A number of SLFS post-secondary categories have been excluded from our definition of post-secondary education, affecting 193 responses. These are diplomas or certificates recognised only by an employer or business, and education taken toward a diploma, certificate, or license from a professional association. Our definition essentially corresponds to the one used by the Canada Student Loans Program and its provincial counterparts. Individuals who have enrolled in both university and trade-vocational or college programs are counted as having gained access to the former.

5. Post-secondary participation rates rise sharply to about age 20, then become much flatter, rising only slightly after this.

6. This said, we did not want the models to include an excessive number of variables, and some of those used represent aggregates of the corresponding underlying variables (i.e., we combined categories where appropriate), while other variables found to have little influence were dropped from the analysis.

7. Two points are worth noting about the parental education measure. First, in the survey questionnaire a parent was placed in the high school category only if a diploma was obtained, while they were counted in the College or University category simply by having participated at that level of schooling, without necessarily having finished. These definitions necessarily extend to our study. Second, parents' education was gathered only for those with whom the respondent was living at the time of the survey, thus excluding non-custodial divorced and separated parents.

of separate variables for the father and mother. When neither parent's education is reported the linear education measure is set to zero, and the "don't know" indicator is used. This eliminates the intrinsic difficulty of disentangling the effects of a missing parent's education from the family type effects related to single-parent families, although we test the effects of mother's versus father's education in a separate analysis of two-parent families. It should be noted that family income, a possibly interesting background variable, is not available and this may influence the interpretation of the coefficient on education given their positive correlation. This implies that inasmuch as it is correlated with both the dependent variables and parents' education, it will bias the coefficient on parents' education. It is likely that the estimated coefficients on education will be larger than they would be were family income included as a regressor if family income has any effect on access. This caveat needs to be borne in mind in interpreting the results below.

Two general sets of models are estimated, reflecting our treatment of parental education. In the first, it is captured by a single "years of parental education" variable. In the second, a series of categorical (dummy) variables is used: less than high school completed, high school completed, some or completed college, some or completed university, unknown. The variables in the latter model thus correspond to the information available in the survey data, while the linear variable is derived from these categories.[8] The first model thus captures the effects of parental education in a single parameter, while the second identifies some nonlinearities of interest in these relationships.[9]

Sample restrictions were kept to a minimum so that the results would be as representative of the underlying population as possible. Individuals who migrated to Canada after the age of ten or who obtained most of their schooling outside of Canada were deleted, since the relationship between educational attainment and family background is likely to be different for this group. We also eliminated the relatively few unclear responses, missing values, and certain "don't know" and "do not apply" responses. The resulting sample contains 5,669 (or 90.2 percent) of the initial 6,284 observations.

8. The linear variable was derived by assigning the following values: no high school: 8, less than high school completed: 10, high school completed: 12, some or completed college: 14, some or completed university: 16. The first two categories were combined in the indicator variables because differentiating them added nothing to the model. Unknown education receives its own dummy variable.

9. In the linear specification, if parental education was not available, the variable was assigned a value of zero. In addition, if the respondent was in a family type with at least one parent and that information should, therefore, have been available, a "Don't Know" indicator variable was created. This allows the parental education coefficient to be interpreted as the effect for those for whom the information is available. For those in "Other" family types (i.e., there was no parent present and hence no parental education information available), this extra variable was not assigned because the family type indicator captures the whole missing parental education effect along with the family type effect (i.e., it is impossible to separate the two influences since they are perfectly correlated).

V. *Descriptive statistics*

V.1 Dependent and background variables

Descriptive statistics for the variables used in the analysis are shown in Table 1. The dependent variables, background variables, and intermediate variables are shown in Panels A, B, and C in turn.[10] Almost all the explanatory variables are dichotomous and the table shows the percentage of individuals with each characteristic, and the associated post-secondary education participation rates (not being dichotomous, the linear parents' education variable has no associated rates defined). These univariate relationships are interesting and identify some of the patterns to watch for in the regression analysis to follow.

As shown in Panel A, 68 percent of the male respondents and 77 percent of the females in our samples (aged 22-24) had participated in some form of post-secondary education, while 31 and 39 percent, respectively, had gone to university. The rates of going to trade-vocational school or college as opposed to university are (obtained by subtraction) 37 percent for males, and 38 percent for females. Females have significantly higher overall post-secondary participation rates than males, driven by their higher rates of university attendance, which are 26 percent greater than that for the males.[11]

Acquiring post-secondary education is strongly related to parental education as seen in Panel B. Both males and females with university-educated parents are more than twice as likely to go to university themselves than those whose parents stopped after high school, and the gap is wider still when the comparison is made with those whose parents did not complete high school. The differences are much smaller, however, for the Any Post-secondary measure, thus indicating that a substantial number of children with less educated parents manage to make it into the college and trade-vocational system, especially in the case of females.[12]

Post-secondary participation is also significantly related to family type. For example, 42 percent of all female respondents who lived in a two-parent family went to university, whereas only 29 percent of those who lived in a mother-only family did so. The less common situations of living in a father-only family or with others (i.e., neither parent) are associated with rates of 38 and 20 percent, respectively. For males, the patterns are a little different, but the higher rate for two-parent families persists, at 33 percent, versus 25, 15, and 14 percent for the other family types

10. The place of residence variables (province, urban-rural), are treated as background variables because they represent where the individual lived while in high school. Urban-rural status could be viewed as an intermediate variable in alternative interpretations, but this makes no substantive difference.

11. There are many ways to measure post-secondary participation, and for different populations, so these figures will not necessarily compare directly to other published data on post-secondary participation. They seem reasonable, however, when placed against others.

12. Although not presented, the data indicate that going to community college (not combined with university) is negatively related to parental education (youth with less educated parents are more likely to go to college). But the effects of parental education on college participation are both positive and negative: having more highly educated parents is related to higher post-secondary participation at *some* level (a positive effect), but a greater chance of going to university rather than college among those who go (a negative effect).

(mother-only, father-only, and other). We shall see that this gender pattern, interestingly, persists in the regression findings below. The patterns vary somewhat for the Any Post-secondary education measure, but the two-parent family advantage again holds.

By province (representing where the individual lived while in high school), the Any Post-secondary attendance rate in Quebec (francophones, anglophones, other language types together) is especially high among females, reflecting to at least some degree the inclusion of CEGEP students (Quebec's amalgam of community college and pre-university preparation which substitutes for the last years of high school in other provinces). In this respect, it is perhaps surprising that the rate is not higher for Quebec males, who are in the low-middle range of the provincial ordering. University attendance among Quebec females is in the middle rank in comparison to the other provinces, and low for males. Individuals from Nova Scotia, Newfoundland, and Ontario generally have high Any Post-secondary attendance rates, while Saskatchewan and Nova Scotia have the highest University attendance rates among both males and females. Those from urban backgrounds are somewhat more likely to go on to some sort of post-secondary education, and are far more likely to go to university, consistent with Frenette (2002, 2003).

In terms of minority language (anglophones in Quebec, francophones and other primary languages elsewhere), English-speaking females in Quebec have the highest rate of post-secondary participation by both measures of any group. The same dominance is not seen, however, for anglophone males in Quebec. Francophones in other provinces have high rates of Any Post-secondary participation, but more average rates of University participation in comparison to the anglophone majorities. Individuals brought up with other languages have average participation rates.

Respondents of Asian background are uniformly more likely to attend all types of post-secondary institutions (Any Post-secondary, University) than any other ethnic group, for both genders. Asian women, however, although still the most likely female ethnic group to attend university, do not enrol in nearly the numbers that their male counterparts do (47 percent versus 75 percent). In contrast, Native (First Nations) Canadians are less likely to go to a university or post-secondary institutions than any other ethnic group.

V.2 Intermediate variables

Panel C of Table 1 shows the intermediate variables representing school performance, attitudes, and related outcomes, along with the associated post-secondary participation rates. Brief titular descriptions of each variable are provided in panel C, as are the range of values each may take. It is interesting to observe that girls failed fewer grades, had higher averages, skipped fewer classes, were more interested in school, participated more, and were more likely to get along with their teachers. They also had less difficulty in English, whereas boys did better in Math and Sciences by these measures. Females graduating high school with 'A' averages had a 65, and males a 63, percent rate of university attendance. By contrast, substantially fewer than 10 percent of those

with 'D' or 'F' averages went to university,[13] and the rate is just 15-16 percent for 'C' average students. The relationship between grade average and Any Post-secondary participation is much weaker, reflecting the Canadian system where access to trade-vocational schools or community colleges is open even to those with minimal qualifications.

The other relationships offer no surprises, but their magnitudes are interesting, coming as they do from a representative sample of young people followed into their post-secondary years. Rates of post-secondary participation, especially at the university level, are higher for those who went to private school, who didn't skip classes, who had no difficulty in math, science, or English (French for Francophones), who enjoyed school, participated more, found classes interesting, and got along with their teachers, who had parents or friends that attached a strong importance to high school (almost the entire sample in the case of the former), or who had no physical disability. Finally, working a small number of hours at a job while in high school is associated with the highest Any Post-secondary and University participation rates. This roughly corresponds to Bushnik (2003) who finds that working a moderate number of hours in school decreases the likelihood of dropping out, while Ruhm (1997) finds that a moderate work commitment in high school is positively correlated with future earnings.

VI. Regression results

VI.1 The direct effects models

Tables 2 through 5 present the Any Post-secondary and University access model results for males and females where parental education is represented by a single "years of schooling" measure. The direct effect ("long") models based on equation 5 above, where both the background and intermediate variables are included, are presented in the first columns of numbers in these tables. The total effect models and the implied indirect effects take up the rest of the tables. Since the sample sizes are modest for some of the intermediate and background variable categories, we estimated models, which we do not present to conserve space, similar to those presented but with a male indicator variable added and the two sexes combined. This approach resulted, in general, in more precise estimates and some of the variables with marginally statistically significant coefficients became statistically significant. It also led to a masking of the differences between the sexes. Overall, the pattern observed was similar to those presented and supports the interpretations below.

Parental education and family type

Parental education has a strong direct effect on post-secondary participation in all models. Since the parental education variables are also interacted with the single-parent family indicators ("live father" and "live mother"), the coefficients on the "Years of par educ" variable taken alone represent the relationship between parental education and post-secondary participation for two-parent families, while the interactions pick up the differences in these effects (if any) for the

13. The latter rates might seem high, and could represent either the mis-reporting of grades, or perhaps "mature students" going to university after a stint in the workforce, when grades are less important for meeting entrance requirements.

other family types. Each year of parents' education for the baseline two-parent family type is associated with approximately a 2 percent increase in the likelihood of Any Post-secondary attendance, and a 3 to 4 percent increase in the likelihood of University attendance. The four year conventional difference between high school and university is thus worth about an 8 percent increase in doing Any Post-secondary schooling, and a 12 or 16 percent increase for University. These are large effects. What makes these impacts important is that they are direct effects and exist after controlling for all the other background variables available in our data and the measures of high school outcomes, behaviour, and attitudes. Thus, parental education plays an important role in determining who goes on to post-secondary education, and at what level, even after accounting for a wide range of other factors, though, as mentioned, this is an upper bound if omitted intermediate variables are important.

Turning to the other family types, we first see that those who do not know their parents' education have low average rates of post-secondary participation, equivalent to those whose parents have about 7 to 10 years of schooling on average.[14] Further, although they are only sometimes individually statistically significant, the general pattern of the parental education-family type interactions suggests that the access gaps between two-parent and single-parent families grow somewhat with the level of parental education. That is, most of the interactions are negative—which are set against the general years of parental education variable just discussed. Seen from another perspective, the relationship between parental education and access appears to be in most cases weaker for single-parent families than two-parent families, and in some cases appears to be essentially flat, although the smaller sample sizes contribute to a general lack of precision of these estimates, especially for single-father families.

The family type indicators for lone-mother and lone-father families are not particularly interesting on their own, since the reduced effects of parents' education just mentioned need to be taken into account when making comparisons of access rates across family types (i.e., the models allow both the intercept and the slope on parental education to differ by family type). Table 6 shows predicted participation rates, based on the model coefficient estimates, by family type at various levels of parental education, and indicates that children from lone-mother families (for whom the sample sizes permit such comparisons), have uniformly lower participation rates than those from two-parent families for any given level of parental education. Those who lived under other arrangements—alone, or with others—for whom parental education is not measured, faired worst of all (detailed calculations not shown).

Geography: Province and urban-rural residence

While relatively few of the provincial coefficients are significantly different statistically from Ontario (the omitted category), in the Any Post-secondary regressions, individuals from New Brunswick and Manitoba have lower rates of attendance than Ontario. This pattern, however, disappears for the University models, indicating that the differences occur at the college level. Nova Scotia clearly focuses on university education and has the highest rate of university participation in the country for both sexes. In contrast, the coefficients for Quebec are negative

14. This is seen by comparing the coefficient on "Parents' educ DK" with "Years of par educ" evaluated at any given number of years.

except for the female Any Post-secondary regression, which reflects at least in part the CEGEP system, where "college" includes the equivalent of the final year(s) of high school. Quebec appears to have one of the lowest rates of University participation.[15]

Living in a rural area has a uniformly negative impact, although the effect is statistically insignificant for Any Post-secondary, it is quite sizeable and statistically significant for University attendance among both males and females. This is consistent with the descriptive statistics and suggests that access to community college is easier for those living in rural areas than is access to university.

Ethnicity and language

Most of the minority language variables are not statistically significant, indicating that rates of post-secondary participation are not substantially different for English speakers in Quebec, French speakers out of Quebec, or those who speak a third language in any province (in comparison to the majority language speaker in each case—Francophones in Quebec, Anglophones elsewhere). The one exception is Francophone females out of Quebec, who have an estimated 17 percent *higher*—not lower—rate of Any Post-secondary education than others. The absence of minority language effects presumably attests to a combination of government and institutional policies which attempt to provide individuals with opportunities for pursuing higher education in the language of their choice (a system which is perhaps especially developed in the case of Anglophones in Quebec and Francophones in New Brunswick), along with minorities' ability to adapt to local circumstances or any particular motivation or other unobserved characteristics they might possess. The absence of a third language effect is also interesting in this respect.

Ethnic origin yields a number of quite strong findings. After controlling for other factors, individuals of Asian and South/East European ethnicity are much more likely to pursue post-secondary studies than others. For Asians, this trend is especially strong among males, particularly in the University models, where—holding other factors constant—they have a remarkable 27 percentage point higher rate of participation than those of the baseline (omitted) North and West European heritage.

For South and East Europeans, the effect is also generally strong and positive, and equally so for both genders, leaving this group with the highest participation rates among females. Those with mixed origins also tend to have relatively higher participation rates, while the pattern for those with other origins is mixed. Native (First Nation) Canadians have lower participation rates only in the female University model, but we will see below that the total effects are different and that the indirect effects play an especially important role for this group.[16]

15. Joint statistical tests (F-tests) of the province of residence coefficients showed the group to be strongly statistically significant for each sex.

16. For an intergenerational analysis of educational attainment by ethnic group see Dicks and Sweetman (1999). Also, joint statistical (F-tests) of the ethnicity and language variables showed the ethnic ones to be strongly significant, but the language set was not so except for the females any post-secondary regression. Language does not appear to be an important indicator of post-secondary attendance in general.

The Intermediate variables

The intermediate variables generally take the expected signs. For example, failing a grade in elementary school is strongly negative—even after taking high school grades and other factors into account, suggesting a long lasting correlation. A higher grade point average has the expected strong positive effects, with the importance of having an 'A' average (relative to the omitted 'B' comparison category) being especially strong for University. Interestingly, regularly skipping classes in high school does not appear to have any effect on post-secondary or university enrolment—again, once grades and other factors are taken into account. Also, working more than 20 hours per week while in high school ("Long work") reduces the likelihood of Any Post-secondary and University attendance by about 5 percent and over 10 percent, respectively. The highest rates are for those who work a little, or not at all in the case of the male University model.

Interestingly, once grades are controlled for, having difficulty in math, science, or the primary language of instruction (English or French) in high school does not appear to significantly affect post-secondary participation. Enjoying high school generally has a positive effect, but is only statistically significant for the Any Post-secondary model. A surprising, and almost paradoxical, finding is that respondents who find high school classes interesting generally have the same, or lower in one model, likelihood of going on than those who do not in this regression context. Similarly, strong class participation has a statistically significant positive effect only for University. Also, not getting along with teachers mostly reduces the likelihood of going on, especially in the Any Post-secondary models.

Parents' opinions of the importance of high school have the intuitively expected effects (where significant), but should be interpreted with caution, since almost all respondents placed their parents in the "high importance" category. Perhaps more interesting is that those whose friends attached only a medium importance to high school (as opposed to high) are significantly less likely to go on. Peer group effects seem to matter, although these results might also reflect self-sorting. Being limited in activity also has negative effects, but significantly so only for females.

VI.2 The total effect models and the implied indirect effects

We turn now to the total effect models, based on equation 8 above, and the implied indirect effects from equation 10 or 11 (the difference between the total and the direct effects), as well as the resulting percentage of the total effect of each variable that is indirect. For parental education, strong as the direct effects were seen to be, the total effects are generally about 50 percent larger. Each additional year of parental education (taking the two-parent case read directly from the relevant variable as an example) is worth a 4 or 3.1 percentage point increase in the probability of Any Post-secondary attendance (males and females, respectively), and 5.4 or 6.5 percentage points for University participation. Otherwise put, close to half (37 to 43 percent) of the effects of parental education operate indirectly through the intermediate variables included in the models, the rest being the direct effects that remain once these other factors are controlled for.

The cumulative effects of parental education, as well as the differences in participation rates between single-mother and two-parent families, are best seen in Table 6—which shows fitted

participation rates at various levels of parental education. Here we see that the family effects are also stronger in the total effects model than the direct effects model. For girls, the likelihood of University access is up to 40 percent higher in a two-parent family, while the direct effect model shows at most a 25 percent difference. And like the direct effect models, the parental education-participation relationship appears to be somewhat flatter for the single-mother and single-father family types than two-parent families, although the relevant interactions are once more non-significant in most cases.

The provincial coefficients are largely of the same sign and otherwise of the same pattern as in the direct models, although the majority of individual coefficients are again not statistically significant. In the cases where the coefficient estimates are small, large "percentage indirect" effects can result simply because the coefficients are effectively bouncing around small, imprecisely estimated numbers. (A negative number for the percentage of the total effect that is indirect means that the latter is greater than the former—which occurs where the indirect and direct effects go in opposing directions.) It is thus worth focussing here, as elsewhere, exclusively on the statistically significant effects.

Limiting ourselves to the provinces where the direct and total effects are both statistically significant, the percentage of the effect that is indirect can be seen to range up to 48 percent of the total. Thus, most provinces associated with intermediate student characteristics and outcomes favourable to going on to post-secondary education also appear to have an additional direct effect on that dynamic (i.e., students in a given province are more likely to go on not only because of their measured characteristics, but for other reasons beyond those characteristics as well). One possibility is that provinces that are more (or less) "pro-education" tend to be so at both the public and post-secondary levels and supply more (or fewer) post-secondary opportunities, that is, more (or fewer) places at colleges or universities. Another possibility is that the province variables are capturing unobserved heterogeneity—of the underlying populations, of labour market opportunities, or of other factors which affect post-secondary education participation rates at all levels.

The minority language effects are largely the same as in the direct models. Francophone women out of Quebec continue to be seen to enrol in Any Post-secondary education at greater rates than their Anglophone co-residents. A new finding is that the indirect effects give Francophone men an advantage in terms of University attendance, but this is largely offset by the direct effects seen earlier.

Turning to the ethnic variables, in most of the statistically significant cases, the total effects are greater than the direct effects seen previously, indicating that the direct effects alone underestimate the total influence of ethnicity, and that a substantial component of these effects comes through the intermediate variables (i.e., higher grades and so on). Asian men are again the most dramatic example. They are 23 percent more likely to engage in Any Post-secondary schooling, and a rather astounding 44 percent more likely to go to University than the omitted European group (and are also ahead of all others) for a given set of background characteristics. The indirect shares of these effects are 44 and 34 percent, respectively. Asian women have much smaller advantages. Those from Southern and Eastern European have the next greatest general advantage, and in this case for men and women alike. Again the total effects are greater than the

direct effects, indicating that a substantial portion of their overall higher rates (13-38 percent after holding other factors constant) operates through the intermediate variables included in the models. The other ethnicity effects are generally smaller and more mixed.

For Native Canadians, the indirect effects are everywhere negative, statistically significant and sometimes quite large, implying that Native Canadians would have lower post-secondary attendance rates than those observed if these effects were all that mattered. Although Native Canadians finish high school with significant disadvantages in terms of their grades and other characteristics, these are largely overcome when post-secondary participation is finally determined (i.e., after taking the direct effects into account), except in the case of Any Post-secondary education for females. This said, all of these models control for some of the factors that presumably drive Native Canadians to lower participation rates, such as lower parental education levels and living in rural areas, so their overall (not regression adjusted) participation rates remain lower than other groups' (see Table 1). This exercise helps disentangle the particular sources of those overall lower rates suggesting that the gap can be attributed to observable characteristics, and thus points to where policy might be brought to bear to equalize their post-secondary opportunities.

The disadvantages for male rural dwellers in terms of University attendance are maintained in the total effects model, and even slightly stronger than in the direct model, 16 percent of the total effect being indirect. The female disadvantage, on the other hand, becomes insignificant in the total effect models, as the positive indirect effects offset the negative direct effects (each significant on its own). In other words, the total effect models miss the fact that females who live in rural areas tend to have high school outcomes and related attributes which should predispose them towards going on to university (if only slightly), while they then actually attend at lower rates than these characteristics would suggest. Whether the latter effect is due to the distance from institutions and related cost factors, attitudes towards university, or other factors cannot, however, be determined from these data.

It is worth drawing attention to the nature of these results: the coefficients reflect differences in participation rates *holding other factors constant*. The effects of Native ethnicity are, for example, seen to be not particularly strong in the direct effects models, and it is only the estimation of the indirect effects where it is found to have more influence. But even here, we control for parental education and place of residence, and these are clearly factors that work against Native Canadians—as evidenced in their overall low participation rates. This is, of course, what a regression model does, and this property in no way undermines the use of this approach for sorting out the various factors that affect post-secondary participation. It only emphasizes the need to interpret the results appropriately. Comparing direct and total effects—and in turn comparing the findings with the raw overall participation rates—helps us do this.

It is also important to recognize that some of these variables need to be interpreted with care, especially the intermediate ones. One set, including those representing grades and the other measures of performance, are fairly objective and thus relatively clear in meaning. But the attitudinal and behavioural measures are probably more prone to measurement error. And throughout, almost any of the variables included in the models may be correlated with

unobserved factors, including "ability", motivation, and other individual, family, and environmental influences.

VI.3 Alternative specifications

Table 7 presents the key parental education and family type variables for the specification where the former is depicted in a series of dummy variables representing the categories available in the raw data: less than high school completed, high school completed (the omitted category), some or completed college, and some or completed university.[17] The models also include the other variables shown in the linear parental education models, but these are not shown because their results do not change to any significant degree.

The parental education variables generally take on the expected sets of coefficients in both the direct and indirect models, and in most cases, each higher level of parental education corresponds to a higher level of post-secondary attendance. The effects are especially strong for the University attendance model where, for example, the likelihood of participating is 32 and 35 percent higher for those with university educated parents as opposed to high school in the total effect models (males and females respectively), and 22 and 24 percent higher in the indirect models. The size of the indirect effect and the percentage of the total effect that is indirect naturally varies, but is generally substantial. For the cases where both the direct and total effects are statistically significant, the indirect effect comprises 17 to 31 percent of the total effect.

Another additional finding centres on the relative importance of father's versus mother's education on post-secondary attainment, as seen in Table 8. Including each of these variables shows that father's education has a far greater influence upon the attainment of male respondents than does mother's education, while the reverse is true for female respondents, although to a slightly lesser extent. This pattern is particularly strong in the University models. Given the nature of the data, this effect is only verified for two-parent families, since we only observe the education of parents residing with the youth.

VII. Conclusion

This paper has examined post-secondary participation in Canada using Statistics Canada's School Leavers and Follow-Up Surveys. Using a block recursive technique, we identify the direct and indirect effects of a number of family background characteristics, as well as the effects of a set of intermediate variables representing high school outcomes and related attitudes and behaviour which are interesting on their own, as well as representing paths through which the background variables operate to affect participation. Two measures of post-secondary access are used: Any Post-secondary, including community colleges and trade-vocational schools, right up to and including university, and University (alone). The analysis is broken down by sex.

17. These categories still pertain to the level of the most highly educated parent, but the findings are again similar (although a bit stronger) when the analysis is restricted to situations where both parents have the indicated level of schooling (results not shown).

The results point to the many and varied factors which affect post-secondary participation and the value of using detailed regression models to identify these influences. The strength of the family background effects even after a wide array of other factors, including elementary and high school academic performance and related measures, have been controlled for are particularly interesting. Family background appears to have an enduring effect on the determination of who goes on to post-secondary participation, even among what appear to be equally qualified, and perhaps even equally motivated young people.

Parental education has uniformly strong direct and indirect effects on access. Each additional year of parental education increases the likelihood of university attendance (where the effects are strongest) as much as about five percentage points. The relative university attendance rates for those whose parents have a high school diploma and those with at least some university education are 29 versus 53 percent in the case of men, and 37 versus 65 percent for women (holding other factors constant). Parental education has another interesting property: father's education seems to have a much stronger effect on sons than daughters, while mother's education has a much greater influence over daughters than sons. Between 37 and 44 percent of these effects are indirect, the rest direct (i.e., they remain after controlling for intermediate outcomes). By family type, those from two-parent families are approximately 25 percent more likely to go on to higher schooling than those from single-mother families according to the direct effects model, and at rates of up to 40 percent greater according to the total effects model.

Participation rates vary by province to some degree, and in most cases the direct and indirect effects work in the same direction. Those from provinces other than Ontario tend to have lower rates of Any Post-secondary participation (holding other factors constant—including the family background measures), but higher rates of University education. Living in a rural area during high school decreases the likelihood of post-secondary attendance, but the effects are statistically significant only in the University models. In these latter cases, for males, the direct and indirect effects work in the same direction, while for females, interestingly, the indirect effects actually favour access while the direct effects are negative, the net negative influence being not statistically different from zero.

Speaking a minority language (English in Quebec, French out of Quebec, or any other language in any province) does not seem to have a statistically significant effect on access, except for Francophone females outside of Quebec in the Any Post-secondary (but not University) models, who attend at a higher rate than their Anglophone neighbours. Asian ethnicity has a very positive effect upon attendance, particularly for men, and especially in the University models. In most, but not all cases, the direct and indirect effects work in the same direction: ethnicity is thus associated with various high school and related outcomes as well as the tendency to go on to further studies conditional on a given set of attributes (background and intermediates). Post-secondary participation rates are uniformly the lowest for Native (First Nation) Canadians, but the effects are almost entirely indirect, operating through high school grades and related outcomes (i.e., Native ethnicity has a negative effect on these), as well as through the levels of the background variables (e.g., lower levels of parental education). In short, our approach shows that the negative effect of native ethnicity is played out early on, during the high school years (when the intermediate variables are formed) or before, rather than at the point of entry into post-secondary schooling.

Turning to the intermediate variables, which are presented in Appendix 1, the results show that working a moderate number of hours at an outside job while in high school is associated with higher levels of attendance in the Any Post-secondary models and also in the University models for girls, but working too many hours uniformly decreases the likelihood of participation by either measures. High school academic performance, captured by the individual's grade average, has a strong, positive influence in both the Any Post-secondary and University models, while failing a grade in elementary school is an additional predictor—early and enduring—in the Any Post-secondary models. Participating in class and school activities also generally has positive effects, as expected.

Although gender differences are not the focus of this paper, it is worth noting that the descriptive statistics indicate that boys are seriously worse off than girls in terms of the intermediate variables. They fail more often, have lower high school grades, enjoy school less and find it less interesting, and get along with teachers less. Given all this, it is not surprising they have statistically lower rates of post-secondary and university attendance.

Table 1 – Descriptive Statistics and Participation Rates

A) Dependent Variables

	Mean	
Post-Secondary Attainment	**Male**	**Female**
None	0,318	0,233
Any Post-Secondary	0,682	0,767
University	0,309	0,389
N	2671	2998

B) Background Variables

	Mean		Participation Rate			
			Any Post-Sec.		University	
Variable	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Parental Education						
Years of father's education	9,100 [0,170]	9,026 [0,170]	na	na	na	na
Years of mother's education	9,738 [0,155]	10,015 [0,146]	na	na	na	na
Years of parent's education	11,072 [0,148]	11,124 [0,142]	na	na	na	na
Don't know	0,086	0,048	0,478	0,703	0,104	0,184
No high school	0,203	0,232	0,522	0,703	0,174	0,162
High school	0,274	0,245	0,663	0,732	0,256	0,336
College	0,158	0,172	0,739	0,883	0,302	0,445
University	0,233	0,228	0,858	0,885	0,573	0,659
Family Type (Lived with ...)						
two parents	0,821	0,794	0,712	0,800	0,333	0,420
father	0,036	0,022	0,620	0,851	0,145	0,380
mother	0,097	0,109	0,552	0,696	0,247	0,289
other	0,047	0,075	0,457	0,507	0,141	0,203
Province at Age 15						
Newfoundland	0,029	0,032	0,706	0,710	0,304	0,284
Prince Edward Island	0,005	0,006	0,613	0,755	0,327	0,368
Nova Scotia	0,038	0,036	0,711	0,762	0,372	0,454
New Brunswick	0,032	0,033	0,570	0,643	0,238	0,345
Quebec	0,227	0,238	0,624	0,824	0,249	0,367
Ontario	0,370	0,376	0,738	0,785	0,319	0,420
Manitoba	0,043	0,041	0,577	0,694	0,317	0,454
Saskatchewan	0,042	0,041	0,687	0,758	0,370	0,473
Alberta	0,099	0,090	0,675	0,705	0,323	0,391
British Columbia	0,115	0,105	0,676	0,722	0,361	0,291
Urban/Rural						
Urban	0,755	0,763	0,702	0,781	0,342	0,408
Rural	0,245	0,237	0,621	0,723	0,208	0,326
Language						
Majority	0,931	0,932	0,681	0,762	0,313	0,386
English speaker in Quebec	0,035	0,028	0,683	0,872	0,269	0,499
French speaker out of Quebec	0,021	0,024	0,700	0,862	0,238	0,368
Other primary language	0,013	0,015	0,694	0,768	0,275	0,373
Ethnicity						
North & West Europe	0,539	0,511	0,672	0,772	0,291	0,393
South & East Europe	0,101	0,097	0,740	0,841	0,386	0,461
Canada	0,135	0,164	0,621	0,721	0,240	0,306
Asian	0,029	0,029	0,926	0,900	0,750	0,468
Native	0,039	0,039	0,568	0,496	0,198	0,290
Other	0,026	0,020	0,605	0,907	0,372	0,385
Mixed	0,078	0,093	0,774	0,828	0,354	0,516
Unknown	0,053	0,048	0,671	0,697	0,276	0,275
Age						
22	0,311	0,336	0,665	0,764	0,275	0,399
23	0,335	0,329	0,696	0,770	0,356	0,374
24	0,354	0,335	0,684	0,769	0,296	0,394

Table 1 -- Descriptive Statistics and Participation Rates (continued)

C) Intermediate Variables	Mean		Participation Rate			
			Any Post-Sec.		University	
Variable	Male	Female	Male	Female	Male	Female
High School Type						
Private	0.081	0.106	0.789	0.889	0.443	0.564
Public	0.919	0.894	0.672	0.753	0.298	0.368
Elementary School Success						
Failed grade	0.206	0.084	0.443	0.481	0.075	0.048
Never failed	0.794	0.916	0.744	0.794	0.370	0.420
HS Grades						
A average	0.199	0.290	0.881	0.896	0.631	0.648
B average	0.407	0.466	0.732	0.779	0.323	0.361
C average	0.311	0.181	0.578	0.607	0.151	0.157
D or F average	0.050	0.021	0.333	0.474	0.035	0.071
Don't know average	0.034	0.042	0.377	0.591	0.117	0.059
Skip High School Classes						
Skipped	0.608	0.556	0.673	0.745	0.294	0.352
Didn't Skip	0.392	0.434	0.696	0.796	0.333	0.434
Job during High School						
No job	0.341	0.381	0.677	0.738	0.362	0.377
Worked < 10 hours / week	0.117	0.130	0.763	0.846	0.390	0.502
Worked 10-20 hours / week	0.316	0.362	0.743	0.811	0.322	0.409
Worked 20+ hours / week	0.226	0.127	0.563	0.654	0.172	0.251
Math Outcome in High School						
No difficulty	0.608	0.536	0.723	0.801	0.365	0.471
Difficulty	0.391	0.461	0.618	0.728	0.223	0.295
N/A	0.001	0.002	0.625	0.935	0.350	0.000
Science Outcome in High School						
No difficulty	0.723	0.695	0.726	0.794	0.349	0.428
Difficulty	0.248	0.278	0.598	0.720	0.216	0.312
N/A	0.029	0.027	0.285	0.579	0.130	0.160
English Outcome in High School						
No difficulty	0.724	0.840	0.733	0.787	0.364	0.421
Difficulty	0.276	0.159	0.547	0.664	0.167	0.219
N/A	0.001	0.001	0.210	0.302	0.000	0.000
HS Enjoyment						
Enjoyed	0.832	0.862	0.723	0.797	0.341	0.415
Didn't enjoy	0.168	0.138	0.480	0.580	0.155	0.227
Class Participation in HS						
Low	0.114	0.108	0.573	0.669	0.258	0.289
Medium	0.679	0.662	0.663	0.758	0.269	0.345
High	0.208	0.229	0.803	0.843	0.470	0.562
Interest in HS Classes						
Found interesting	0.733	0.799	0.703	0.780	0.317	0.407
Uninterested	0.267	0.201	0.622	0.719	0.290	0.317
Parents' Opinion of Importance of HS						
High	0.938	0.949	0.695	0.785	0.325	0.407
Medium	0.058	0.048	0.492	0.436	0.072	0.059
Low	0.004	0.002	0.407	0.382	0.002	0.000
Friends' Opinion of Importance of HS						
High	0.708	0.798	0.736	0.813	0.359	0.436
Medium	0.252	0.168	0.581	0.604	0.206	0.204
Low	0.038	0.033	0.367	0.523	0.066	0.190
Physical Disability						
Yes	0.046	0.062	0.518	0.626	0.238	0.178
No	0.954	0.938	0.690	0.777	0.313	0.403
Relationship With Teacher in HS						
Didn't get along	0.049	0.020	0.359	0.431	0.113	0.169
Got along	0.951	0.980	0.698	0.774	0.320	0.393

Note: Rates not applicable (na) for continuous variables

Table 2 – Male Any Post-Secondary OLS Regression Results

Variable	Direct Effect Coef.	Direct Effect Std. Err.	Total Effect Coef.	Total Effect Std. Err.	Indirect Effect Coef.	Indirect Effect Std. Err.	% Indirect
Parents' Education and Family Type							
Years of par educ	0,022 ***	[0,006]	0.040 ***	[0,006]	0,017 ***	[0,003]	43%
Par educ DK	0,146 *	[0,088]	0,276 ***	[0,097]	0,129 ***	[0,050]	47%
Yrs par educ & live fath	-0,009	[0,028]	-0,019	[0,032]	-0,010	[0,012]	53%
Yrs par educ & live moth	-0,006	[0,017]	-0,005	[0,019]	0,001	[0,008]	-13%
Par educ DK & live fath	0,237	[0,369]	0,140	[0,420]	-0,097	[0,169]	-70%
Par educ DK & live moth	-0,076	[0,241]	-0,115	[0,274]	-0,039	[0,126]	34%
Live father	0,106	[0,335]	0,143	[0,382]	0,037	[0,150]	26%
Live mother	-0,007	[0,211]	-0,045	[0,241]	-0,038	[0,104]	85%
Live other	0,107	[0,097]	0.230 **	[0,109]	0,123 **	[0,048]	53%
Place of Residence							
Newfoundland	-0,002	[0,045]	0,032	[0,047]	0,034	[0,022]	105%
Prince Edward I.	-0,057	[0,056]	-0,065	[0,058]	-0,008	[0,024]	13%
Nova Scotia	0,010	[0,041]	0,010	[0,042]	0,000	[0,018]	-5%
New Brunswick	-0,117 **	[0,053]	-0,126 **	[0,055]	-0,009	[0,025]	7%
Quebec	-0,101 **	[0,039]	-0,056	[0,041]	0,046 *	[0,024]	-81%
Manitoba	-0,113 ***	[0,044]	-0,149 ***	[0,046]	-0,036 **	[0,018]	24%
Saskatchewan	-0,043	[0,043]	-0,017	[0,045]	0,026	[0,020]	-155%
Alberta	-0,059	[0,040]	-0,083 **	[0,041]	-0,023	[0,019]	28%
British Columbia	-0,077 *	[0,040]	-0,075 *	[0,042]	0,002	[0,018]	-3%
Rural	-0,022	[0,031]	-0,033	[0,034]	-0,011	[0,016]	34%
Language and Ethnicity							
English in Quebec	0,070	[0,070]	0,004	[0,091]	-0,065	[0,052]	-1506%
French out of Quebec	0,072	[0,069]	0,124 *	[0,069]	0,052	[0,039]	42%
Other language	0,020	[0,105]	0,017	[0,122]	-0,003	[0,057]	-16%
S & E Europe	0,068	[0,045]	0,093 *	[0,051]	0,026	[0,022]	27%
Canadian	-0,004	[0,040]	-0,017	[0,042]	-0,013	[0,018]	75%
Asian	0,129 ***	[0,041]	0.230 ***	[0,041]	0,101 ***	[0,023]	44%
Native	0,020	[0,071]	-0,067	[0,075]	-0,087 **	[0,038]	130%
Origin other	-0,053	[0,086]	-0,088	[0,111]	-0,035	[0,056]	40%
Origin mixed	0,079 *	[0,042]	0,086 *	[0,046]	0,006	[0,021]	7%
Intermediate Variables							
Private HS	0,053	[0,039]					
Failed Elem School	-0,163 ***	[0,034]					
A average	0,059 *	[0,031]					
C average	-0,070 **	[0,031]					
D/F average	-0,201 ***	[0,066]					
Skip class	0,002	[0,026]					
Short work	0,031	[0,036]					
Medium work	0,022	[0,028]					
Long work	-0,084 ***	[0,032]					
Math is difficult	-0,006	[0,027]					
Science is difficult	-0,042	[0,030]					
English is difficult	-0,031	[0,030]					
Enjoy school	0,085 **	[0,040]					
Low class part.	-0,013	[0,043]					
High class part.	0,032	[0,029]					
Find class interesting	-0,027	[0,030]					
Med parent opinion	0,014	[0,056]					
Low parent opinion	-0,072	[0,227]					
Med friend opinion	-0,059 *	[0,031]					
Low friend opinion	-0,111	[0,081]					
Limited activity	-0,115 *	[0,069]					
Not along w teacher	-0,113 *	[0,066]					
R^2	0,257		0,110		N/A		

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance. N = 2671
Regressions also include indicator variables for non-response as listed in Table 1.

Table 3 – Female Any Post-Secondary OLS Regression Results

Variable	Direct Effect Coeff.	Direct Effect Std. Err.	Total Effect Coeff.	Total Effect Std. Err	Indirect Effect Coeff.	Indirect Effect Std. Err.	% Indirect
Parents' Education and Family Type							
Years of par educ	0,018 ***	[0,005]	0,031 ***	[0,005]	0,014 ***	[0,003]	44%
Par educ DK	0,202 **	[0,090]	0,307 ***	[0,095]	0,105 **	[0,043]	34%
Yrs par educ & live fath	0,030	[0,022]	0,030	[0,022]	0,000	[0,011]	0%
Yrs par educ & live moth	-0,010	[0,017]	-0,008	[0,018]	0,002	[0,007]	-31%
Par educ DK & live fath	0,324	[0,380]	0,142	[0,465]	-0,183	[0,213]	-129%
Par educ DK & live moth	-0,120	[0,265]	-0,112	[0,268]	0,008	[0,104]	-8%
Live father	-0,327	[0,312]	-0,315	[0,325]	0,012	[0,147]	-4%
Live mother	0,096	[0,214]	0,034	[0,219]	-0,062	[0,094]	-183%
Live other	0,042	[0,086]	0,143	[0,089]	0,100 **	[0,045]	70%
Place of Residence							
Newfoundland	0,027	[0,042]	0,016	[0,043]	-0,011	[0,021]	-70%
Prince Edward I.	0,062	[0,046]	0,015	[0,049]	-0,047 **	[0,022]	-303%
Nova Scotia	0,059	[0,037]	0,031	[0,039]	-0,028	[0,018]	-89%
New Brunswick	-0,099 *	[0,050]	-0,127 **	[0,052]	-0,028	[0,023]	22%
Quebec	0,073 *	[0,038]	0,096 **	[0,039]	0,022	[0,021]	23%
Manitoba	-0,067 *	[0,039]	-0,077 *	[0,042]	-0,010	[0,017]	13%
Saskatchewan	0,006	[0,037]	0,001	[0,040]	-0,005	[0,019]	-412%
Alberta	-0,051	[0,037]	-0,088 **	[0,038]	-0,037 **	[0,018]	42%
British Columbia	-0,009	[0,041]	-0,045	[0,041]	-0,036 **	[0,017]	80%
Rural	-0,014	[0,025]	-0,007	[0,028]	0,006	[0,013]	-86%
Age							
Age 23	0,000	[0,026]	0,009	[0,027]	0,008	[0,012]	99%
Age 24	0,028	[0,027]	0,024	[0,030]	-0,004	[0,014]	-17%
Language and Ethnicity							
English in Quebec	-0,055	[0,071]	-0,049	[0,068]	0,006	[0,027]	-13%
French out of Quebec	0,171 ***	[0,061]	0,186 ***	[0,057]	0,015	[0,027]	8%
Other language	0,012	[0,096]	-0,060	[0,110]	-0,072	[0,046]	120%
S & E Europe	0,086 **	[0,042]	0,126 ***	[0,044]	0.040 **	[0,016]	32%
Canadian	-0,024	[0,032]	-0,064 *	[0,037]	-0.040 **	[0,019]	62%
Asian	0,102 *	[0,055]	0,126 **	[0,060]	0,024	[0,023]	19%
Native	-0,140 **	[0,063]	-0,219 ***	[0,071]	-0,079 **	[0,033]	36%
Origin other	0,110 **	[0,049]	0,125 ***	[0,045]	0,015	[0,030]	12%
Origin mixed	0,072 **	[0,036]	0,066 *	[0,038]	-0,006	[0,015]	-9%
Intermediate Variables							
Private HS	0,037	[0,036]					
Failed Elem School	-0,154 ***	[0,052]					
A average	0,045 *	[0,025]					
C average	-0,072 **	[0,035]					
D/F average	-0,139	[0,104]					
Skip class	0,009	[0,022]					
Short work	0,038	[0,033]					
Medium work	0,037	[0,025]					
Long work	-0,032	[0,047]					
Math is difficult	-0,004	[0,026]					
Science is difficult	0,005	[0,027]					
English is difficult	-0,002	[0,034]					
Enjoy school	0.100 **	[0,042]					
Low class part.	-0,045	[0,042]					
High class part.	0,025	[0,028]					
Find class interesting	-0,037	[0,030]					
Med parent opinion	-0,215 ***	[0,078]					
Low parent opinion	-0,020	[0,164]					
Med friend opinion	-0,086 **	[0,035]					
Low friend opinion	-0,099	[0,081]					
Limited activity	-0,060	[0,057]					
Not along w teacher	-0,151 *	[0,087]					
R^2	0,212		0,110		N/A		

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance. N = 2998
Regressions also include indicator variables for non-response as listed in Table 1.

Table 4 – Male University OLS Regression Results

Variable	Direct Effect Coeff.	Direct Effect Std. Err.	Total Effect Coeff.	Total Effect Std. Err	Indirect Effect Coeff.	Indirect Effect Std. Err.	% Indirect
Parents' Education and Family Type							
Years of par educ	0,033 ***	[0,006]	0,054 ***	[0,006]	0,022 ***	[0,003]	40%
Par educ DK	0,248 ***	[0,083]	0,464 ***	[0,089]	0,216 ***	[0,049]	47%
Yrs par educ & live fath	-0,039 **	[0,015]	-0,052 ***	[0,016]	-0,013	[0,009]	25%
Yrs par educ & live moth	-0,007	[0,016]	-0,015	[0,017]	-0,008	[0,009]	53%
Par educ DK & live fath	-0,325	[0,221]	-0,534 **	[0,246]	-0,209 *	[0,127]	39%
Par educ DK & live moth	-0,002	[0,203]	-0,214	[0,206]	-0,212 *	[0,125]	99%
Live father	0,402 **	[0,193]	0,482 **	[0,207]	0,080	[0,112]	17%
Live mother	0,080	[0,191]	0,149	[0,199]	0,068	[0,106]	46%
Live other	0,329 ***	[0,084]	0,502 ***	[0,091]	0,173 ***	[0,053]	35%
Place of Residence							
Newfoundland	-0,004	[0,042]	0,088 **	[0,041]	0,092 ***	[0,021]	105%
Prince Edward I.	0,093 *	[0,048]	0,102 *	[0,054]	0,009	[0,025]	9%
Nova Scotia	0,103 ***	[0,038]	0,112 ***	[0,040]	0,009	[0,018]	8%
New Brunswick	0,001	[0,042]	0,025	[0,047]	0,024	[0,024]	94%
Quebec	-0,084 **	[0,039]	0,021	[0,038]	0,105 ***	[0,024]	497%
Manitoba	0,044	[0,039]	0,018	[0,041]	-0,026	[0,019]	-145%
Saskatchewan	0,050	[0,043]	0,104 **	[0,048]	0,054 ***	[0,021]	52%
Alberta	0,006	[0,036]	-0,021	[0,039]	-0,027	[0,018]	128%
British Columbia	0,029	[0,041]	0,022	[0,044]	-0,007	[0,018]	-29%
Rural	-0,061 ***	[0,023]	-0,073 ***	[0,026]	-0,012	[0,015]	16%
Age							
Age 23	0,057 **	[0,029]	0,091 ***	[0,029]	0,035 **	[0,014]	38%
Age 24	0,028	[0,028]	0,041	[0,030]	0,012	[0,016]	31%
Language and Ethnicity							
English in Quebec	-0,029	[0,071]	-0,093	[0,071]	-0,064	[0,043]	69%
French out of Quebec	-0,058	[0,054]	0,030	[0,078]	0,089 **	[0,043]	292%
Other language	-0,060	[0,132]	-0,044	[0,146]	0,016	[0,055]	-35%
S & E Europe	0,154 ***	[0,048]	0,177 ***	[0,055]	0,023	[0,024]	13%
Canadian	0,017	[0,031]	-0,019	[0,034]	-0,036 **	[0,018]	188%
Asian	0,272 ***	[0,087]	0,414 ***	[0,084]	0,142 ***	[0,029]	34%
Native	0,022	[0,057]	-0,062	[0,055]	-0,085 ***	[0,030]	136%
Origin other	0,090	[0,083]	0,061	[0,102]	-0,030	[0,050]	-49%
Origin mixed	0,042	[0,049]	0,031	[0,053]	-0,011	[0,023]	-36%
Intermediate Variables							
Private HS	0,049	[0,048]					
Failed Elem School	-0,124 ***	[0,026]					
A average	0,192 ***	[0,036]					
C average	-0,122 ***	[0,028]					
D/F average	-0,176 ***	[0,044]					
Skip class	-0,006	[0,024]					
Short work	-0,016	[0,041]					
Medium work	-0,074 ***	[0,029]					
Long work	-0,149 ***	[0,031]					
Math is difficult	-0,009	[0,025]					
Science is difficult	-0,022	[0,027]					
English is difficult	-0,036	[0,025]					
Enjoy school	0,031	[0,030]					
Low class part.	0,036	[0,037]					
High class part.	0,056 *	[0,032]					
Find class interesting	-0,061 **	[0,030]					
Med parent opinion	-0,087 **	[0,044]					
Low parent opinion	-0,106 *	[0,063]					
Med friend opinion	-0,052 **	[0,026]					
Low friend opinion	-0,072	[0,055]					
Limited activity	-0,032	[0,049]					
Not along w teacher	-0,040	[0,037]					
R^2	0,317		0,154		N/A		

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance. N = 2671
Regressions also include indicator variables for non-response as listed in Table 1.

Table 5 – Female University OLS Regression Results

Variable	Direct Effect Coeff.	Direct Effect Std. Err.	Total Effect Coeff.	Total Effect Std. Err	Indirect Effect Coeff.	Indirect Effect Std. Err.	% Indirect
Parents' Education and Family Type							
Years of par educ	0,041 ***	[0,006]	0,065 ***	[0,006]	0,024 ***	[0,003]	37%
Par educ DK	0,463 ***	[0,094]	0,625 ***	[0,101]	0,163 ***	[0,050]	26%
Yrs par educ & live fath	-0,041	[0,035]	-0,028	[0,038]	0,013	[0,015]	-47%
Yrs par educ & live moth	-0,015	[0,017]	-0,023	[0,017]	-0,007	[0,010]	32%
Par educ DK & live fath	-0,557	[0,499]	-0,546	[0,508]	0,011	[0,242]	-2%
Par educ DK & live moth	-0,239	[0,240]	-0,271	[0,232]	-0,031	[0,137]	12%
Live father	0,536	[0,482]	0,350	[0,499]	-0,187	[0,197]	-53%
Live mother	0,145	[0,210]	0,198	[0,202]	0,053	[0,123]	27%
Live other	0,411 ***	[0,095]	0,619 ***	[0,092]	0,207 ***	[0,050]	34%
Place of Residence							
Newfoundland	-0,014	[0,044]	-0,006	[0,044]	0,008	[0,027]	-143%
Prince Edward I.	0,044	[0,046]	0 .000	[0,052]	-0,043	[0,027]	-10661%
Nova Scotia	0,121 ***	[0,039]	0,099 **	[0,044]	-0,022	[0,023]	-22%
New Brunswick	0,034	[0,048]	-0,007	[0,050]	-0,041	[0,027]	581%
Quebec	-0,067 *	[0,040]	0,000	[0,042]	0,068 ***	[0,024]	14674%
Manitoba	0,042	[0,041]	0,040	[0,044]	-0,002	[0,022]	-5%
Saskatchewan	0,031	[0,040]	0,058	[0,045]	0,027	[0,026]	46%
Alberta	0,009	[0,039]	-0,064	[0,041]	-0,073 ***	[0,022]	114%
British Columbia	-0,069 *	[0,041]	-0,132 ***	[0,041]	-0,064 ***	[0,021]	48%
Rural	-0,055 **	[0,028]	-0,030	[0,029]	0,025 *	[0,015]	-81%
Age							
Age 23	-0,020	[0,027]	-0,023	[0,029]	-0,004	[0,015]	16%
Age 24	0,015	[0,029]	0,012	[0,032]	-0,003	[0,016]	-29%
Language and Ethnicity							
English in Quebec	0,014	[0,086]	0,028	[0,089]	0,014	[0,038]	50%
French out of Quebec	-0,009	[0,083]	0,046	[0,078]	0,055	[0,040]	121%
Other language	0,041	[0,114]	-0,031	[0,138]	-0,072	[0,055]	232%
S & E Europe	0,101 **	[0,050]	0,164 ***	[0,055]	0,063 ***	[0,022]	38%
Canadian	-0,010	[0,034]	-0,060	[0,037]	-0,050 **	[0,020]	84%
Asian	0,003	[0,074]	0,042	[0,076]	0,039	[0,030]	94%
Native	0,059	[0,058]	-0,025	[0,062]	-0,085 **	[0,035]	334%
Origin other	-0,080	[0,090]	-0,062	[0,104]	0,019	[0,043]	-30%
Origin mixed	0,102 **	[0,042]	0,092 *	[0,048]	-0,010	[0,021]	-11%
Intermediate Variables							
Private HS	0,104 **	[0,046]					
Failed Elem School	-0,144 ***	[0,036]					
A average	0,175 ***	[0,033]					
C average	-0,129 ***	[0,033]					
D/F average	-0,122 *	[0,071]					
Skip class	-0,021	[0,026]					
Short work	0,017	[0,041]					
Medium work	-0,022	[0,030]					
Long work	-0,102 ***	[0,039]					
Math is difficult	-0,079 ***	[0,028]					
Science is difficult	0,000	[0,029]					
English is difficult	-0,033	[0,034]					
Enjoy school	0,043	[0,041]					
Low class part.	-0,001	[0,041]					
High class part.	0,076 **	[0,033]					
Find class interesting	-0,013	[0,032]					
Med parent opinion	-0,131 ***	[0,048]					
Low parent opinion	0,070	[0,148]					
Med friend opinion	-0,061 *	[0,032]					
Low friend opinion	-0,044	[0,074]					
Limited activity	-0.110 **	[0,045]					
Not along w teacher	0,046	[0,073]					
R^2	0,2943		0,1475		N/A		

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance. N = 2998
Regressions also include indicator variables for non-response as listed in Table 1.

Table 6 – Predicted Participation Rates by Family Type

Parent Educ.	Two-Parent Families		Single-Mother Families	
	Direct Effect Model	Total Effect Model	Direct Effect Model	Total Effect Model
A) Any Post-Secondary				
Male				
Don't know	0,618	0,500	0,527	0,341
No HS	0,668	0,569	0,610	0,483
HS	0,760	0,713	0,672	0,599
College	0,812	0,795	0,711	0,672
University	0,857	0,860	0,747	0,739
Female				
Don't know	0,781	0,718	0,739	0,627
No HS	0,704	0,672	0,737	0,652
HS	0,786	0,793	0,757	0,733
College	0,832	0,857	0,770	0,782
University	0,871	0,906	0,783	0,825
B) University				
Male				
Don't know	0,100	0,104	0,071	0,041
No HS	0,167	0,146	0,169	0,141
HS	0,271	0,286	0,251	0,245
College	0,354	0,405	0,315	0,333
University	0,444	0,534	0,386	0,431
Female				
Don't know	0,222	0,214	0,149	0,141
No HS	0,159	0,186	0,124	0,174
HS	0,269	0,365	0,216	0,291
College	0,360	0,507	0,295	0,384
University	0,459	0,649	0,385	0,485

Note: Aside from the regressors that define each cell, the predictions are with all indicator variables set to zero (i.e., the prediction is for someone in all the omitted groups).

Table 7 – Regression Results - Dummy Variable Specification

	Direct Effect		Total Effect		Indirect Effect		%
Variable	Coef.	Std. Err.	Coef.	Std. Err	Coef.	Std. Err.	Indirect
A) Any Post-Secondary -- Male							
Parent educ DK	-0,097	[0,060]	-0,179 ***	[0,065]	-0,082 **	[0,035]	46%
Parent educ no HS	-0,009	[0,043]	-0,065	[0,045]	-0,057 ***	[0,020]	87%
Parent educ college	0,066 *	[0,039]	0.079* *	[0,044]	0,013	[0,020]	17%
Parent educ uni	0,125 ***	[0,034]	0,194 ***	[0,037]	0,069 ***	[0,018]	36%
Par DK & live fath	0,165	[0,200]	0,190	[0,215]	0,025	[0,090]	13%
Par no HS & live fath	-0,268	[0,164]	-0,235	[0,189]	0,033	[0,077]	-14%
Par coll & live fath	-0,095	[0,272]	-0,195	[0,273]	-0,100	[0,100]	51%
Par uni & live fath	-0,355 *	[0,193]	-0,373 *	[0,206]	-0,018	[0,088]	5%
Par DK & live moth	-0,033	[0,139]	-0,085	[0,147]	-0,053	[0,071]	62%
Par no HS & live moth	-0,016	[0,112]	-0,014	[0,125]	0,002	[0,056]	-12%
Par coll & live moth	-0,104	[0,131]	-0,175	[0,151]	-0,071	[0,085]	40%
Par uni & live moth	-0,040	[0,124]	-0,030	[0,141]	0,010	[0,057]	-34%
Live father	0,179	[0,114]	0,096	[0,125]	-0,083	[0,052]	-86%
Live mother	-0,050	[0,081]	-0,076	[0,083]	-0,025	[0,034]	34%
Live other	-0,138 **	[0,069]	-0,228 ***	[0,076]	-0.090 ***	[0,035]	40%
R^2	0,259		0,111		N/A		
B) Any Post-Secondary -- Female							
Parent educ DK	0,023	[0,071]	-0,039	[0,074]	-0,062 **	[0,026]	157%
Parent educ no HS	-0,004	[0,040]	-0,053	[0,043]	-0.050 ***	[0,015]	93%
Parent educ college	0,108 ***	[0,036]	0,139 ***	[0,037]	0,031 **	[0,014]	22%
Parent educ uni	0.090 ***	[0,034]	0,136 ***	[0,034]	0,046 ***	[0,015]	33%
Par DK & live fath	-0,211	[0,227]	-0,411	[0,339]	-0,200	[0,156]	49%
Par no HS & live fath	-0,438 ***	[0,158]	-0,425 **	[0,179]	0,013	[0,083]	-3%
Par coll & live fath	-0,058	[0,100]	-0,113	[0,097]	-0,055	[0,085]	48%
Par uni & live fath	-0,148 *	[0,078]	-0,133	[0,084]	0,015	[0,061]	-11%
Par DK & live moth	0,042	[0,166]	0,000	[0,177]	-0,042	[0,063]	-14350%
Par no HS & live moth	0,036	[0,099]	0,026	[0,104]	-0,010	[0,043]	-39%
Par coll & live moth	0,153 *	[0,093]	0,119	[0,093]	-0,034	[0,046]	-29%
Par uni & live moth	-0,057	[0,119]	-0,082	[0,136]	-0,025	[0,045]	31%
Live father	0,219 ***	[0,066]	0,240 ***	[0,077]	0,021	[0,044]	9%
Live mother	-0,062	[0,075]	-0,078	[0,080]	-0,016	[0,031]	21%
Live other	-0.140 **	[0,059]	-0,205 ***	[0,061]	-0,065 **	[0,027]	32%
R^2	0.220		0,117		N/A		
C) University -- Male							
Parent educ DK	-0.110 **	[0,045]	-0,152 ***	[0,043]	-0,042	[0,028]	28%
Parent educ no HS	-0,012	[0,036]	-0,068 *	[0,038]	-0,056 ***	[0,019]	82%
Parent educ college	0,020	[0,040]	0,041	[0,044]	0,021	[0,019]	51%
Parent educ uni	0,220 ***	[0,037]	0,316 ***	[0,042]	0,097 ***	[0,021]	31%
Par DK & live fath	-0,025	[0,176]	-0,053	[0,207]	-0,028	[0,082]	53%
Par no HS & live fath	-0,145	[0,151]	-0,083	[0,164]	0,063	[0,062]	-76%
Par coll & live fath	-0,227	[0,154]	-0,256 *	[0,148]	-0,029	[0,099]	11%
Par uni & live fath	-0,426 ***	[0,158]	-0,453 ***	[0,162]	-0,026	[0,070]	6%
Par DK & live moth	0,096	[0,092]	-0,004	[0,082]	-0,100	[0,069]	2456%
Par no HS & live moth	0,012	[0,091]	0,066	[0,097]	0,055	[0,053]	82%
Par coll & live moth	0,135	[0,117]	0,059	[0,128]	-0,076	[0,073]	-130%
Par uni & live moth	-0,070	[0,126]	-0,069	[0,131]	0 .000	[0,055]	0%
Live father	0,101	[0,132]	0,006	[0,141]	-0,095 **	[0,048]	-1629%
Live mother	-0,019	[0,064]	-0,062	[0,063]	-0,042	[0,033]	68%
Live other	-0,028	[0,048]	-0,117 **	[0,050]	-0,089 **	[0,035]	76%
R^2	0,328		0,168		N/A		
D) University -- Female							
Parent educ DK	0,026	[0,063]	-0,099	[0,071]	-0,125 ***	[0,035]	126%
Parent educ no HS	-0,015	[0,043]	-0,081 *	[0,046]	-0,066 ***	[0,018]	82%
Parent educ college	0,101 **	[0,047]	0,147 ***	[0,051]	0,046 **	[0,019]	31%
Parent educ uni	0,244 ***	[0,040]	0,345 ***	[0,044]	0,101 ***	[0,020]	29%
Par DK & live fath	-0,009	[0,275]	-0,171	[0,275]	-0,162	[0,152]	95%
Par no HS & live fath	0,252	[0,317]	0,234	[0,317]	-0,018	[0,099]	-8%
Par coll & live fath	-0,053	[0,281]	-0,093	[0,333]	-0,040	[0,125]	43%
Par uni & live fath	-0,091	[0,276]	-0,011	[0,306]	0,079	[0,089]	-691%
Par DK & live moth	-0,153	[0,137]	-0,142	[0,137]	0,012	[0,078]	-8%
Par no HS & live moth	-0,131	[0,104]	-0,152	[0,108]	-0,021	[0,059]	14%
Par coll & live moth	-0,139	[0,120]	-0,208	[0,136]	-0,069	[0,064]	33%
Par uni & live moth	-0,166	[0,130]	-0,276 *	[0,148]	-0.110 *	[0,061]	40%
Live father	-0,012	[0,241]	-0,031	[0,258]	-0,019	[0,062]	60%
Live mother	0,059	[0,073]	0,065	[0,088]	0,006	[0,041]	10%
Live other	-0,037	[0,053]	-0,116 **	[0,053]	-0,079 ***	[0,028]	68%
R^2	0,297		0,149		N/A		

Note: Robust standard errors in brackets; * 10% significance; ** 5% significance; *** 1% significance.
Other regressors are as in the comparable regressions in Tables 3 through 6. N(female)=2998; N(male)=2671.

Table 8 – Regression Results - Father-Mother Specification

Variable	Direct Effect Coef.	Direct Effect Std. Err.	Total Effect Coef.	Total Effect Std. Err	Indirect Effect Coef.	Indirect Effect Std. Err.	% Indirect
A) Any Post-Secondary -- Male							
Fath educ DK	-0,067	[0,064]	-0,123 *	[0,068]	-0,057 *	[0,031]	46%
Fath educ no HS	-0,015	[0,041]	-0,062	[0,043]	-0,047 **	[0,018]	76%
Fath educ coll	0,093 **	[0,043]	0,113 **	[0,046]	0,020	[0,019]	18%
Fath educ uni	0.140 ***	[0,040]	0,195 ***	[0,045]	0,056 **	[0,022]	29%
Moth educ DK	0,003	[0,059]	-0,032	[0,059]	-0,035	[0,029]	109%
Moth educ no HS	0,028	[0,037]	-0,001	[0,040]	-0,029	[0,018]	2038%
Moth educ coll	0,002	[0,038]	0,002	[0,046]	0,000	[0,022]	5%
Moth educ uni	0,029	[0,040]	0,056	[0,043]	0,027	[0,021]	48%
R^2	0,245		0,111		N/A		
B) Any Post-Secondary -- Female							
Fath educ DK	0,016	[0,062]	-0,042	[0,060]	-0,058 **	[0,028]	138%
Fath educ no HS	0,030	[0,037]	0,010	[0,039]	-0,021	[0,015]	-215%
Fath educ coll	0,060	[0,037]	0,077 *	[0,042]	0,017	[0,017]	22%
Fath educ uni	0,049	[0,037]	0,061	[0,040]	0,012	[0,018]	20%
Moth educ DK	0,041	[0,059]	0,022	[0,060]	-0,020	[0,027]	-91%
Moth educ no HS	-0,023	[0,036]	-0,065 *	[0,038]	-0,043 **	[0,017]	65%
Moth educ coll	0,063 *	[0,034]	0,090 **	[0,038]	0,027	[0,017]	30%
Moth educ uni	0,082 **	[0,035]	0,119 ***	[0,037]	0,037 **	[0,017]	31%
R^2	0,195		0,082		N/A		
C) University -- Male							
Fath educ DK	-0,162 ***	[0,052]	-0,191 ***	[0,055]	-0,029	[0,030]	15%
Fath educ no HS	-0,087 **	[0,036]	-0.120 ***	[0,039]	-0,033 *	[0,019]	28%
Fath educ coll	-0,026	[0,050]	-0,003	[0,052]	0,024	[0,022]	-806%
Fath educ uni	0.200 ***	[0,047]	0.290 ***	[0,054]	0.090 ***	[0,026]	31%
Moth educ DK	0,025	[0,053]	-0,005	[0,055]	-0,029	[0,029]	643%
Moth educ no HS	0,024	[0,037]	-0,014	[0,039]	-0,037 **	[0,018]	274%
Moth educ coll	0,011	[0,046]	0,032	[0,052]	0,021	[0,024]	65%
Moth educ uni	0,086 *	[0,045]	0,121 **	[0,053]	0,036	[0,024]	29%
R^2	0,351		0,206		N/A		
D) University -- Female							
Fath educ DK	-0,052	[0,065]	-0.145**	[0,066]	-0,093 **	[0,036]	64%
Fath educ no HS	-0,019	[0,043]	-0,037	[0,047]	-0,018	[0,020]	49%
Fath educ coll	0,058	[0,050]	0.095*	[0,056]	0,038	[0,025]	40%
Fath educ uni	0,131 ***	[0,046]	0.197***	[0,051]	0,066 ***	[0,025]	33%
Moth educ DK	0,047	[0,070]	0,014	[0,075]	-0,034	[0,035]	-251%
Moth educ no HS	0,015	[0,038]	-0,050	[0,041]	-0,066 ***	[0,019]	130%
Moth educ coll	0,089 *	[0,047]	0.122**	[0,052]	0,032	[0,024]	27%
Moth educ uni	0,218 ***	[0,047]	0.279***	[0,052]	0,061 **	[0,025]	22%
R^2	0,317		0,167		N/A		

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance.
Other regressors are as in the comparable regressions in Tables 3 through 6. N(female)=2036; N(male)=2075.

Appendix 1 - The intermediate variable models

Given the large number of intermediate equations (one per intermediate variable) and regressors, only a few selected results are presented in Table A1. These are examples of the relationship between a subset of the family background factors and three intermediate variables—they represent the indirect paths by which family background can affect post-secondary participation.[18] The results shown capture the effects of parental education and family type on the probability of having failed a grade in elementary school, of obtaining an 'A' average in high school, and of working long hours.

Parental education has a strong positive effect on the likelihood that the respondent had an 'A' average and (especially for males) a negative effect upon the likelihood of failing a grade in elementary school. It does not have as strong an effect on working long hours, but family structure is a better predictor of this. Each additional year of parental education increases the likelihood of an 'A' average for both males and females by approximately four percent.[19] Since obtaining an 'A' average in high school increases the likelihood of university attendance by almost 20 percent (as will be seen below), each year of parental education has, in addition to its direct effects, an indirect effect—through its influence on the individual's probability of getting an 'A' average—of almost one percent on the likelihood of university attendance. In contrast, failing a grade also has a strong (negative) effect on post-secondary participation, thus comprising another path by which parental education affects the likelihood of going to college or university.

The cumulative indirect influence of the full set of background variables on each intermediate outcome results in a substantial indirect effect of family background on post-secondary access. This is, however, best seen in the comparison of the direct and indirect effect models, to which we now turn.

18. No distinction needs to be made between the two definitions of post-secondary access here because these variables do not enter the intermediate regressions.

19. The proper interpretation of the various combinations of parental education and family type variables (including interactions) are explained below, but for the purposes here, we can focus on the general "years of parental education variable", which has a straightforward interpretation for two-parent families.

Appendix Table 1 – Selected Intermediate Regressions

Background Variables	Selected Intermdiate Dependent Variables: Failed elem grade		"A" avrg		Long working hrs	
	Coef.	Std. Err	Coef.	Std. Err	Coef.	Std. Err
A) MALE						
Years of par educ	-0,022 ***	[0,006]	0,043 ***	[0,006]	-0,001	[0,006]
Par educ DK	-0,226 **	[0,090]	0,397 ***	[0,078]	-0,064	[0,080]
Yrs par educ & live fath	0,043 **	[0,017]	-0.040 ***	[0,008]	-0.040 *	[0,021]
Yrs par educ & live moth	-0,012	[0,016]	-0,046 ***	[0,014]	0,018	[0,013]
Par educ DK & live fath	0,749 **	[0,297]	-0,392 ***	[0,110]	-0,190	[0,341]
Par educ DK & live moth	0,308	[0,246]	-0,480 **	[0,194]	0,658 ***	[0,216]
Live father	-0,478 **	[0,189]	0,323 ***	[0,101]	0,494 *	[0,284]
Live mother	0,200	[0,209]	0,489 ***	[0,180]	-0,266 *	[0,161]
Live other	-0,311 ***	[0,091]	0,410 ***	[0,078]	0,226 **	[0,099]
R-squared	0,086		0,136		0,077	
B) FEMALE						
Years of par educ	-0,010 ***	[0,003]	0,045 ***	[0,006]	-0.001	[0,003]
Par educ DK	0,081	[0,093]	0,305 ***	[0,080]	0,249 ***	[0,084]
Yrs par educ & live fath	-0,020	[0,017]	-0,021	[0,047]	0,001	[0,009]
Yrs par educ & live moth	0.006	[0,008]	-0,020	[0,019]	0,019	[0,012]
Par educ DK & live fath	-0,149	[0,373]	-0,514	[0,602]	-0,285 *	[0,151]
Par educ DK & live moth	-0,200	[0,132]	-0,370	[0,233]	0,129	[0,206]
Live father	0,245	[0,253]	0,428	[0,598]	#VALUE!	[0,125]
Live mother	0,187	[0,102]	0,309	[0,231]	#VALUE!	[0,143]
Live other	-0,094 *	[0,051]	0,570 ***	[0,091]	0.170 **	[0,069]
R-squared	0,068		0,113		0,100	

Note: Robust standard errors in brackets: * 10% significance; ** 5% significance; *** 1% significance.
The regressions contain the full set of background variables seen in Table 1. N(female)=2998; N(male)=2671.

Appendix 2 – Key variable definitions

For the Dummy and Father-Mother specifications, parental education is categorized as No HS, HS, College, University, or Don't Know. For the Linear specification, we transform known responses onto a linear scale using the number of years that each level of education generally requires. The No HS variable is broken down into two parts, with Less than Grade 9 given a value of 8, while HS Incomplete = 10. The rest of the variables proceed logically, with HS = 12, College = 14, and University = 16.

A set of family type dummy variables are created to represent possible family types while the respondent was in high school. The possible choices are Live 2 Parents, Live Mother, Live Father, and Live Other. Parental education and family type are interacted in a variety of manners, depending on the specification selected. In each instance, every parental education variable is interacted with every dummy variable. For the Father-Mother specification, no interaction is necessary since that specification is restricted to 2 Parent families only.

Provincial variables are included, representing the province of high school residence. This acts as a proxy for where the student grew up and was educated. Similarly, an Urban/Rural designation is created, representing the respondent's residence while in high school.

The language spoken in the home of the respondent ("first language") is not included as a variable. Instead, we create a set of minority language dummy variables. Specifically, English speakers in Quebec are assigned one dummy variable (English in Quebec); French speakers outside of Quebec are assigned another (French outside of Quebec); and respondents with another first language are placed in a third minority language dummy variable (Other Lang.). This leaves the province variables to represent those of the majority language group in each province while these minority language indicators allow language effects to vary by region, something that more conventional specifications do not permit.

The ethnicity of each respondent is captured by distilling the detailed ethnicity categories in the SLS/SLFS into eight dummy variables representing various world regions. These are North & West Europe, South & East Europe, Canadian, Asian, Native, Other, Mixed, and Unknown. We assign individuals to a particular ethnic category unless they indicate multiple backgrounds overlapping more than one of our categories. Such persons were placed into the catch-all Mixed category. There are some exceptions to this rule. Specifically, anyone claiming Native origin, regardless of other ethnic background, is placed solely in the Native category. Conversely, the Canadian ethnicity of any respondent is ignored unless it is the only category they chose, in which case the person is given that classification. Those who indicated Other in the SLS/SLFS are placed into our Other category, except in a few special cases.[20] Those who selected Unknown in the survey are placed into the Unknown category in our study.

20. Individuals choosing an ethnicity of Other in the SLS/SLFS are then further grouped by that survey into a number of sub-categories consisting of less represented areas of the world. Some of these areas match up well with the ethnic categories we created. Respondents from such areas are shifted out of Other and added to the appropriate ethnic category.

The high school academic success of students is reported using dummy variables representing the traditional range of letter-grades. One adjustment has been made, namely combining `D' and `F' averages into a single variable. The sample size of these two variables on their own was quite small, and the effects were similar.

The perceived high school success of respondents in math, science, and their primary language is broken into three sets of dummy variables. Each set contains the possible responses of "difficulty", "no difficulty", or "not applicable".

The number of hours performed each week at a job during the school year is captured using four dummy variables.[21] These categories are No Work, Short Work (less than 10 hours), Med. Work (10 to 19 hours), and Long Work (20+ hours).

Further variables used in this study required no special modification.

21. Hours of Work could not be left in its original linear form because estimation indicated that a lower number of working hours was beneficial with regard to the likelihood of post-secondary attendance, whereas a high number of hours can be quite detrimental. The concave shape of this relationship does not lend itself to linear representation.

References

Betts, Julian R. 1996. "What do Students Know About Wages? Evidence from a Survey of Undergraduates." *Journal of Human Resources.* 31, 1: 27–56.

Bouchard, Brigitte and John Zhao. 2000. "University Education: Recent Trends in Participation, Accessibility and Returns." *Education Quarterly Review.* 6, 4: 24–32. Statistics Canada Catalogue No. 81-003-XIE1999004 Ottawa: Statistics Canada.

Bushnik, Tracey. 2003. *Learning, Earning and Leaving: The Relationship between Working While in High School and Dropping Out.* Statistics Canada Catalogue 81-595-MIE, no. 4. Ottawa: Statistics Canada.

Butlin, George. 1999. "Determinants of Post-secondary Participation." *Education Quarterly Review.* 5,3: 9–35. Statistics Canada Catalogue No. 81-003-XIE1999004 Ottawa: Statistics Canada.

Cameron, Stephen V. and Christopher Taber. 2004. "Estimation of Educational Borrowing Constraints Using Returns to Schooling." *Journal of Political Economy.* 112, 1: 132–182.

Carneiro, Pedro and James Heckman. 2002. "The Evidence on Credit Constraints in Post-secondary Schooling." *Economic Journal.* 112, 482: 705–734.

Coleman, J.S. 1966. *Equality of Educational Opportunity.* Washington, DC: U.S. Dept. of Health, Education, and Welfare, Office of Education.

Corak, Miles, Garth Lipps and John Zhao. 2003. *Family Income and participation in post-secondary education.* Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2003210. Analytical Studies Branch. Ottawa: Statistics Canada.

Christofides, Louis N., Jim Cirello, and Michael Hoy. 2001. "Family Income and Postsecondary Education In Canada." *The Canadian Journal of Higher Education.* 31, 1: 177–208.

Currie, Janet. 2001. Early Childhood Education Programs" *Journal of Economic Perspectives.* 15, 2: 213–238.

De Broucker, Patrice and Laval Lavallée. 1998a. "Getting ahead in life: Does your parents' education count?" *Education Quarterly Review.* 5, 1: 22–28. Statistics Canada Catalogue No. 81-003-XIE1998001 Ottawa: Statistics Canada.

De Broucker, Patrice and Laval Lavallée. 1998b. "Intergenerational Aspects of Education and Literacy Skills Acquisition." In *Labour Markets, Social Institutions, and the Future of Canada's Children.* Miles Corak (ed.). Statistics Canada Catalogue no. 89-553-XIB1998001 Ottawa: Statistics Canada.

Dicks, Gordon and Arthur Sweetman. 1999. "Education and Ethnicity in Canada: An Intergenerational Perspective." *Journal of Human Resources.* 34, 4: 668–696.

Dynarski, Susan. 2002. "The Behavioural and Distributional Implications of Aid for College." *The American Economic Review.* 92, 2: 279-285.

Finnie, Ross, Christine Laporte and Eric Lascelles. 2004. *Family Background and Access to Post-secondary Education: What Happened over the 1990s?* Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2004226. Analytical Studies Branch. Ottawa: Statistics Canada.

Foley, K. 2001. "Why stop after high school? A Descriptive Analysis of the Most Important Reasons that High School Graduates Do Not Continue to PSE." Montreal: Canada Millennium Scholarship Foundation.

Frenette, Marc. 2002. Too far to go on? Distance to school and university participation. Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2002191. Analytical Studies Branch. Ottawa: Statistics Canada.

Frenette, Marc. 2003. *Access to college and university: does distance matter?* Analytical Studies Research Paper Series. Catalogue no. 11F0019MIE2003201. Analytical Studies Branch. Ottawa: Statistics Canada.

Greene, William H. 2003. *Econometric Analysis*, 5th ed. Upper Saddle River, NJ.: Prentice Hall, Inc.

Haveman, Robert and Barbara Wolfe. 1995. "The Determinants of Children's Attainments: A Review of Methods and Findings." *Journal of Economic Literature.* 33, 4: 1829–1878.

Heller, Donald. 1997. "Student Price Response in Higher Education: An Update to Leslie and Brinkman." *Journal of Higher Education.* 68, 6: 624–659.

Hemingway, Fred. 2003. "Assessing Canada's Student Aid Need Assessment Policies." Montreal: Canada Millennium Scholarship Foundation.

Junor, Sean and Alexander Usher. 2002. *The Price of Knowledge, Access and Student Finance, in Canada.* Montreal: Canada Millennium Scholarship Foundation, Research Series.

Kane, Thomas J. 2001. "College-Going and Inequality: A Literature Review." Paper prepared for the Russell Sage Foundation.

Knighton, Tamara and Sheba Mirza. 2002. "Postsecondary participation: the effects of parents' education and household income." *Education Quarterly Review.* 8, 3: 25–32. Statistics Canada Catalogue No. 81-003-XPB2001.

Looker, Dianne E. 2001. *Why don't they go on? Factors affecting the decisions of Canadian youth not to pursue post-secondary education.* Montreal: Canada Millennium Scholarship Foundation.

Ma, Xin and Don Klinger. 2000. "Hierachical Linear Modelling of Student and School Effects on Academic Achievement." *Canadian Journal of Education.* 2,1: 41–55.

Moffitt, Robert, A. 1999. "New Developments in Econometric Methods for Labor Market Analysis." In *Handbook of Labor Economics 3A*, Chapter 24. O. Ashenfelter and D. Card (eds.). New York: Elsevier.

Ruhm, Christopher J. 1997. "Is High School Employment Consumption or Investment?" *Journal of Labor Economics.* 15, 4: 735–776.

Willms, J. D. 1999. "Quality and inequality in children's literacy: The effects of families, schools, and communities." In *Developmental health and the wealth of nations: Social, biological, and educational dynamics*. D. Keating and C. Hertzman (eds.). New York: Guilford Press. 72-93.

Zhao, John and Patrice de Broucker. 2001. "Participation in postsecondary education and family income." *The Daily*, December 7. Statistics Canada Catalogue No. 11-001E. Ottawa: Statistics Canada.

Zhao, John and Patrice de Broucker. 2002. "Participation in postsecondary education and family income." *The Daily*, January 9. Statistics Canada Catalogue No. 11-001E. Ottawa: Statistics Canada.

ANALYTICAL STUDIES
RESEARCH PAPER SERIES

No. 1 *Behavioural Response in the Context of Socio-Economic Microanalytic Simulation,* ***Lars Osberg (April 1986)***

No. 2 *Unemployment and Training,* ***Garnett Picot (1987)***

No. 3 *Homemaker Pensions and Lifetime Redistribution,* ***Michael Wolfson (August 1987)***

No. 4 *Modeling the Lifetime Employment Patterns of Canadians,* ***Garnett Picot (Winter 1986)***

No. 5 *Job Loss and Labour Market Adjustment in the Canadian Economy,* ***Garnett Picot and Ted Wannell (1987)***

No. 6 *A System of Health Statistics: Toward a New Conceptual Framework for Integrating Health Data,* ***Michael C. Wolfson (March 1990)***

No. 7 *A Prototype Micro-Macro Link for the Canadian Household Sector,* ***Hans J. Adler and Michael C. Wolfson (August 1987)***

No. 8 *Notes on Corporate Concentration and Canada's Income Tax,* ***Michael C. Wolfson (October 1987)***

No. 9 *The Expanding Middle: Some Canadian Evidence on the Deskilling Debate,* ***John Myles (Fall 1987)***

No. 10 *The Rise of the Conglomerate Economy,* ***Jorge Niosi (1987)***

No. 11 *Energy Analysis of Canadian External Trade: 1971 and 1976,* ***K.E. Hamilton (1988)***

No. 12 *Net and Gross Rates of Land Concentration,* ***Ray D. Bollman and Philip Ehrensaft (1988)***

No. 13 *Cause-Deleted Life Tables for Canada (1972 to 1981): An Approach Towards Analyzing Epidemiological Transition,* ***Dhruva Nagnur and Michael Nagrodski (November 1987)***

No. 14 *The Distribution of the Frequency of Occurrence of Nucleotide Subsequences, Based on Their Overlap Capability,* ***Jane F. Gentleman and Ronald C. Mullin (1988)***

No. 15 *Immigration and the Ethnolinguistic Character of Canada and Quebec,* ***Réjean Lachapelle (1988)***

No. 16 *Integration of Canadian Farm and Off-Farm Markets and the Off-Farm Work of Women, Men and Children,* ***Ray D. Bollman and Pamela Smith (1988)***

No. 17 *Wages and Jobs in the 1980s: Changing Youth Wages and the Declining Middle,* ***J. Myles, G. Picot and T. Wannell (July 1988)***

No. 18 *A Profile of Farmers with Computers,* ***Ray D. Bollman (September 1988)***

No. 19 *Mortality Risk Distributions: A Life Table Analysis,* ***Geoff Rowe (July 1988)***

No. 20 *Industrial Classification in the Canadian Census of Manufactures: Automated Verification Using Product Data,* ***John S. Crysdale (January 1989)***

No. 21 *Consumption, Income and Retirement,* ***A.L. Robb and J.B. Burbridge (1989)***

No. 22 *Job Turnover in Canada's Manufacturing Sector,* ***John R. Baldwin and Paul K. Gorecki (Summer 1989)***

No. 23 *Series on The Dynamics of the Competitive Process,* ***John R. Baldwin and Paul K. Gorecki (1990)***

A. *Firm Entry and Exit Within the Canadian Manufacturing Sector.*
B. *Intra-Industry Mobility in the Canadian Manufacturing Sector.*
C. *Measuring Entry and Exit in Canadian Manufacturing: Methodology.*
D. *The Contribution of the Competitive Process to Productivity Growth: The Role of Firm and Plant Turnover.*
E. *Mergers and the Competitive Process.*
F. *n/a*
G. *Concentration Statistics as Predictors of the Intensity of Competition.*
H. *The Relationship Between Mobility and Concentration for the Canadian Manufacturing Sector.*

No. 24 *Mainframe SAS Enhancements in Support of Exploratory Data Analysis,* ***Richard Johnson, Jane F. Gentleman and Monica Tomiak (1989)***

No. 25 *Dimensions of Labour Market Change in Canada: Intersectoral Shifts, Job and Worker Turnover,* ***John R. Baldwin and Paul K. Gorecki (1989)***

No. 26 *The Persistent Gap: Exploring the Earnings Differential Between Recent Male and Female Postsecondary Graduates,* ***Ted Wannell (1989)***

No. 27 *Estimating Agricultural Soil Erosion Losses From Census of Agriculture Crop Coverage Data,* ***Douglas F. Trant (1989)***

No. 28 *Good Jobs/Bad Jobs and the Declining Middle: 1967-1986,* ***Garnett Picot, John Myles, Ted Wannel (1990)***

No. 29 *Longitudinal Career Data for Selected Cohorts of Men and Women in the Public Service, 1978-1987,* ***Garnett Picot and Ted Wannell (1990)***

No. 30 *Earnings and Death-Effects Over a Quarter Century,* ***Michael Wolfson, Geoff Rowe, Jane F. Gentleman and Monica Tomiak (1990)***

No. 31 *Firm Response to Price Uncertainty: Tripartite Stabilization and the Western Canadian Cattle Industry,* ***Theodore M. Horbulyk (1990)***

No. 32 *Smoothing Procedures for Simulated Longitudinal Microdata,* ***Jane F. Gentleman,Dale Robertson and Monica Tomiak (1990)***

No. 33 *Patterns of Canadian Foreign Direct Investment Abroad,* ***Paul K. Gorecki (1990)***

No. 34 *POHEM - A New Approach to the Estimation of Health Status Adjusted Life Expectancy,* ***Michael C. Wolfson (1991)***

No. 35 *Canadian Jobs and Firm Size: Do Smaller Firms Pay Less?,* ***René Morissette (1991)***

No. 36 *Distinguishing Characteristics of Foreign High Technology Acquisitions in Canada's Manufacturing Sector,* ***John R. Baldwin and Paul K. Gorecki (1991)***

No. 37 *Industry Efficiency and Plant Turnover in the Canadian Manufacturing Sector,* ***John R. Baldwin (1991)***

No. 38 *When the Baby Boom Grows Old: Impacts on Canada's Public Sector,* ***Brian B. Murphy and Michael C. Wolfson (1991)***

No. 39 *Trends in the Distribution of Employment by Employer Size: Recent Canadian Evidence,* ***Ted Wannell (1991)***

No. 40 *Small Communities in Atlantic Canada: Their Industrial Structure and Labour Market Conditions in the Early 1980s,* ***Garnett Picot and John Heath (1991)***

No. 41 *The Distribution of Federal/Provincial Taxes and Transfers in Rural Canada,* ***Brian B. Murphy (1991)***

No. 42 *Foreign Multinational Enterprises and Merger Activity in Canada,* ***John Baldwin and Richard Caves (1992)***

No. 43 *Repeat Users of the Unemployment Insurance Program,* ***Miles Corak (1992)***

No. 44 *POHEM -- A Framework for Understanding and Modeling the Health of Human Populations,* ***Michael C. Wolfson (1992)***

No. 45 *A Review of Models of Population Health Expectancy: A Micro-Simulation Perspective,* ***Michael C. Wolfson and Kenneth G. Manton (1992)***

No. 46 *Career Earnings and Death: A Longitudinal Analysis of Older Canadian Men,* ***Michael C. Wolfson, Geoff Rowe, Jane Gentleman and Monica Tomiak (1992)***

No. 47 *Longitudinal Patterns in the Duration of Unemployment Insurance Claims in Canada,* ***Miles Corak (1992)***

No. 48 *The Dynamics of Firm Turnover and the Competitive Process,* ***John Baldwin (1992)***

No. 49 *Development of Longitudinal Panel Data from Business Registers: Canadian Experience,* ***John Baldwin, Richard Dupuy and William Penner (1992)***

No. 50 *The Calculation of Health-Adjusted Life Expectancy for a Canadian Province Using a Multi-Attribute Utility Function: A First Attempt,* ***J.-M. Berthelot, R. Roberge and M.C. Wolfson (1992)***

No. 51 *Testing the Robustness of Entry Barriers,* ***J.R. Baldwin and M. Rafiquzzaman (1993)***

No. 52 *Canada's Multinationals: Their Characteristics and Determinants,* ***Paul K. Gorecki (1992)***

No. 53 *The Persistence of Unemployment: How Important were Regional Extended Unemployment Insurance Benefits?,* ***Miles Corak, Stephen Jones (1993)***

No. 54 *Cyclical Variation in the Duration of Unemployment Spells,* ***Miles Corak (1992)***

No. 55 *Permanent Layoffs and Displaced Workers: Cyclical Sensitivity, Concentration, and Experience Following the Layoff,* ***Garnett Picot and Wendy Pyper (1993)***

No. 56 *The Duration of Unemployment During Boom and Bust,* ***Miles Corak (1993)***

No. 57 *Getting a New Job in 1989-90 in Canada,* ***René Morissette (1993)***

No. 58 *Linking Survey and Administrative Data to Study Determinants of Health,* ***P. David, J.-M. Berthelot and C. Mustard (1993)***

No. 59 *Extending Historical Comparability in Industrial Classification,* ***John S. Crysdale (1993)***

No. 60 *What is Happening to Earnings Inequality in Canada?,* ***R. Morissette, J. Myles and G. Picot (June 1994)***

No. 61 *Structural Change in the Canadian Manufacturing Sector, (1970-1990),* ***J. Baldwin and M. Rafiquzzaman (July 1994)***

No. 62 *Unemployment Insurance, Work Disincentives, and the Canadian Labour Market: An Overview,* ***Miles Corak (January 1994)***

No. 63 *Recent Youth Labour Market Experiences in Canada,* ***Gordon Betcherman and René Morissette (July 1994)***

No. 64 *A Comparison of Job Creation and Job Destruction in Canada and the United States,* ***John Baldwin, Timothy Dunne and John Haltiwanger (July 1994)***

No. 65 *What is Happening to Weekly Hours Worked in Canada?,* ***René Morissette and Deborah Sunter (June 1994)***

No. 66 *Divergent Inequalities -- Theory, Empirical Results and Prescriptions,* ***Michael C. Wolfson (May 1995)***

No. 67 *XEcon: An Experimental / Evolutionary Model of Economic Growth,* ***Michael C. Wolfson (June 1995)***

No. 68 *The Gender Earnings Gap Among Recent Postsecondary Graduates, 1984-92,* ***Ted Wannell and Nathalie Caron (November 1994)***

No. 69 *A Look at Employment-Equity Groups Among Recent Postsecondary Graduates: Visible Minorities, Aboriginal Peoples and the Activity Limited,* ***Ted Wannell and Nathalie Caron (November 1994)***

No. 70 *Employment Generation by Small Producers in the Canadian Manufacturing Sector,* ***John R. Baldwin and Garnett Picot (November 1994)***

No. 71 *Have Small Firms Created a Disproportionate Share of New Jobs in Canada? A Reassessment of the Facts,* ***Garnett Picot, John Baldwin and Richard Dupuy (November 1994)***

No. 72 *Selection Versus Evolutionary Adaptation: Learning and Post-Entry Performance,* ***J. Baldwin and M. Rafiquzzaman (May 1995)***

No. 73 *Business Strategies in Innovative and Non-Innovative Firms in Canada,* ***J. Baldwin and J. Johnson (February 1995)***

No. 74 *Human Capital Development and Innovation: The Case of Training in Small and Medium Sized-Firms,* ***J. Baldwin and J. Johnson (March 1995)***

No. 75 *Technology Use and Industrial Transformation: Emprirical Perspectives,* ***John Baldwin, Brent Diverty and David Sabourin (August 1995)***

No. 76 *Innovation: The Key to Success in Small Firms,* ***John R. Baldwin (February 1995)***

No. 77 *The Missing Link: Data on the Demand side of Labour Markets,* ***Lars Osberg (April 1995)***

No. 78 *Restructuring in the Canadian Manufacturing Sector from 1970 to 1990: Industry and Regional Dimensions of Job Turnover,* ***J. Baldwin and M. Rafiquzzaman (July 1995)***

No. 79 *Human Capital and the Use of Time,* ***Frank Jones (June 1995)***

No. 80 *Why Has Inequality in Weekly Earnings Increased in Canada?,* ***René Morissette (July 1995)***

No. 81 *Socio-Economic Statistics and Public Policy: A New Role For Microsimulation Modeling,* ***Michael C. Wolfson (July 1995)***

No. 82 *Social Transfers, Changing Family Structure, and Low Income Among Children,* ***Garnett Picot and John Myles (September 1995)***

No. 83 *Alternative Measures of the Average Duration of Unemployment,* ***Miles Corak and Andrew Heisz (October 1995)***

No. 84 *The Duration of Unemployment: A User Guide,* ***Miles Corak and Andrew Heisz (December 1995)***

No. 85 *Advanced Technology Use in Manufacturing Establishments,* ***John R. Baldwin and Brent Diverty (November 1995)***

No. 86 *Technology Use, Training and Plant-Specific Knowledge in Manufacturing Establishments,* ***John R. Baldwin, Tara Gray and Joanne Johnson (December 1995)***

No. 87 *Productivity Growth, Plant Turnover and Restructuring in the Canadian Manufacturing Sector,* ***John R. Baldwin (November 1995)***

No. 88 *Were Small Producers the Engines of Growth in the Canadian Manufacturing Sector in the 1980s?,* ***John R. Baldwin (October 1996)***

No. 89 *The Intergenerational Income Mobility of Canadian Men,* ***Miles Corak and Andrew Heisz (January 1996)***

No. 90 *The Evolution of Payroll Taxes in Canada: 1961 - 1993,* ***Zhengxi Lin, Garnett Picot and Charles Beach (February 1996)***

No. 91 *Project on Matching Census 1986 Database and Manitoba Health Care Files: Private Households Component,* ***Christian Houle, Jean-Marie Berthelot, Pierre David, Cam Mustard, L. Roos and M.C. Wolfson (March 1996)***

No. 92 *Technology-induced Wage Premia in Canadian Manufacturing Plants during the 1980s,* ***John Baldwin, Tara Gray and Joanne Johnson (December 1996)***

No. 93 *Job Creation by Company Size Class: Concentration and Persistence of Job Gains and Losses in Canadian Companies,* ***Garnett Picot and Richard Dupuy (April 1996)***

No. 94 *Longitudinal Aspects of Earnings Inequality in Canada,* ***René Morissette and Charles Bérubé (July 1996)***

No. 95 *Changes in Job Tenure and Job Stability in Canada,* ***Andrew Heisz (November 1996)***

No. 96 *Are Canadians More Likely to Lose Their Jobs in the 1990s?,* ***Garnett Picot and Zhengxi Lin (August 6, 1997)***

No. 97 *Unemployment in the Stock and Flow,* ***Michael Baker, Miles Corak and Andrew Heisz (September 1996)***

No. 98 *The Effect of Technology and Trade on Wage Differentials Between Nonproduction and Production Workers in Canadian Manufacturing,* ***John R. Baldwin and Mohammed Rafiquzzaman (May 1998)***

No. 99 *Use of POHEM to Estimate Direct Medical Costs of Current Practice and New Treatments Associated with Lung Cancer in Canada,* ***C. Houle, B.P. Will, J.-M. Berthelot, Dr. W.K. Evans (May 1997)***

No.100 *An Experimental Canadian Survey That Links Workplace Practices and Employee Outcomes: Why it is Needed and How it Works,* ***Garnett Picot, Ted Wannell (May 1997)***

No.101 *Innovative Activity in Canadian Food Processing Establishments: The Importance of Engineering Practices,* ***John Baldwin and David Sabourin (November 1999)***

No.102 Differences in Strategies and Performances of Different Types of Innovators, ***John R. Baldwin and Joanne Johnson (December 1997)***

No.103 Permanent Layoffs in Canada: Overview and Longitudinal Analysis, ***Garnett Picot, Zhengxi Lin and Wendy Pyper (September, 1997)***

No.104 Working More? Working Less? What do Canadian Workers Prefer?, ***Marie Drolet and René Morissette (May 20, 1997)***

No.105 Growth of Advanced Technology Use in Canadian Manufacturing During the 1990's, ***by John Baldwin, Ed Rama and David Sabourin (December 14, 1999)***

No.106 Job Turnover and Labour Market Adjustment in Ontario from 1978 to 1993, ***by Zhengxi Lin and Wendy Pyper (1997)***

No.107 The Importance of Research and Development for Innovation in Small and Large Canadian Manufacturing Firms, ***John R. Baldwin (September 24, 1997)***

No.108 International Competition and Industrial Performance: Allocative Efficiency, Productive Efficiency, and Turbulence, ***John R. Baldwin and Richard E. Caves (October 1997)***

No.109 The Dimensions of Wage Inequality among Aboriginal Peoples, ***Rachel Bernier (December 1997)***

No.110 Trickling Down or Fizzling Out? Economic Performance, Transfers, Inequality and Low Income, ***Myles Zyblock and Zhengxi Lin (December 10, 1997)***

No.111 Corporate Financial Leverage: A Canada - U.S. Comparison, 1961-1996, ***Myles Zyblock (December 1997)***

No.112 An explanation of the Increasing Age Premium, ***Constantine Kapsalis (July 1998)***

No.113 The Intergenerational Earnings and Income Mobility of Canadian Men: Evidence from Longitudinal Income Tax Data, ***Miles Corak and Andrew Heisz (October, 1998)***

No.114 Foreign-Born vs Native-Born Canadians: A Comparison of Their Inter-Provincial Labour Mobility, ***Zhengxi Lin (September 1998)***

No.115 Living Arrangements and Residential Overcrowding: the situation of older immigrants in Canada, 1991, ***K.G. Basavarajappa (September 1998)***

No.116 What is Happening to Earnings Inequality and Youth Wages in the 1990s?, ***Garnett Picot (July 1998)***

No.117 The Determinants of the Adoption Lag for Advanced Manufacturing Technologies, ***John R. Baldwin and Mohammed Rafiquzzaman (August 1998)***

No.118 Labour Productivity Differences Between Domestic and Foreign-Controlled Establishments in the Canadian Manufacturing Sector, ***John R. Baldwin and Naginder Dhaliwal (March 1, 2000)***

No.119 Technology Adoption: A Comparison Between Canada and the United States, ***John R. Baldwin and David Sabourin (August 1998)***

No.120 Are There High-Tech Industries or Only High-Tech Firms? Evidence From New Technology-Based firms, ***John R. Baldwin and Guy Gellatly (December 1998)***

No.121 A Portrait of Entrants and Exits, ***John R. Baldwin (June 1999)***

No.122 Determinants of Innovative Activity in Canadian Manufacturing Firms: The Role of Intellectual Property Right, ***John R. Baldwin, Petr Hanel and David Sabourin (March 7, 2000)***

No.123 Innovation and Training in New Firms **John R. Baldwin (November 2000)**

No.124 New Views on Inequality Trends in Canada and the United States, **Michael C. Wolfson and Brian B. Murphy (August 1998 and October 1999 (paper)**

No.125 Employment Insurance in Canada: Recent Trends and Policy Changes, **Zhengxi Lin (September 1998)**

No.126 Computers, Fax Machines and Wages in Canada: What Really Matters?, **René Morissette and Marie Drolet (October 1998)**

No.127 Understanding the Innovation Process: Innovation in Dynamic Service Industries, **Guy Gellatly and Valerie Peters (December 1999)**

No.128 Recent Canadian Evidence on Job Quality by Firm Size, **Marie Drolet and René Morissette (November 1998)**

No.129 Distribution, Inequality and Concentration of Income Among Older Immigrants in Canada, 1990 , **K.G. Basavarajappa (April 1999)**

No.130 Earnings Dynamics and Inequality among Canadian Men, 1976-1992: Evidence from Longitudinal Income Tax Records, **Michael Baker and Gary Solon (February 1999)**

No 131 The Returns to Education, and the Increasing Wage Gap Between Younger and Older Workers, **C. Kapsalis, R. Morissette and G. Picot (March 1999)**

No.132 Why Do Children Move Into and Out of Low Income: Changing Labour Market Conditions or Marriage and Divorce?, **G. Picot, M. Zyblock and W. Pyper (March 1999)**

No.133 Rising Self-Employment in the Midst of High Unemployment: An Empirical Analysis of Recent Developments in Canada, **Zhengxi Lin, Janice Yates and Garnett Picot (March 1999)**

No.134 The Entry and Exit Dynamics of Self-Employment in Canada, **Zhengxi Lin, Garnett Picot and Janice Yates (March 1999)**

No.135 Death and Divorce: The Long-term Consequences of Parental Loss on Adolescents, **Miles Corak (June 9, 1999)**

No.136 **Cancelled**

No.137 Innovation, Training and Success, **John Baldwin (October 1999)**

No.138 The Evolution of Pension Coverage of Young and Older Workers in Canada, **René Morissette and Marie Drolet (December 1999)**

No.139 Import Competition and Market Power: Canadian Evidence, **Aileen J. Thompson (April 2000)**

No.140 Gender Composition and Wages: Why is Canada Different from the United States, **Michael Baker and Nicole Fortin (August 2000)**

No.141 The Transition to Work for Canadian University Graduates: Time to First Job, 1982-1990, **Julian Betts, Christopher Ferrall and Ross Finnie (December 2000)**

No.142 *Who Moves? A Panel Logit Model Analysis of Interprovincial Migration in Canada,* **Ross Finnie (August 2000)**

No.143 *Differences in Innovator and Non-Innovator Profiles: Small Establishments in Business Services,* **Guy Gellatly (December 1999)**

No.144 *Social Transfers, Earnings and Low-Income Intensity Among Canadian Children, 1981-1996: Highlighting Recent Development in Low-Income Measurement,* **John Myles and Garnett Picot (March 2000)**

No.145 *How Much of Canada's Unemployment is Structural?,* **Lars Osberg and Zhengxi Lin (October 2000)**

No.146 *To What Extent Are Canadians Exposed to Low-Income?,* **René Morissette and Marie Drolet (April, 2000)**

No.147 *The Maturation of Canada's Retirement Income System: Income Levels, Income Inequality and Low-Income among the Elderly,* **John Myles (March 6, 2000)**

No.148 *The Performance of the 1990s Canadian Labour Market,* **Garnett Picot and Andrew Heisz (April, 2000)**

No.149 *Payroll Taxes in Canada Revisited: Structure, Statutory Parameters, and Recent Trends* **Zhengxi Lin (August, 2001)**

No.150 *Patterns of Corporate Diversification in Canada: An Empirical Analysis,* **John R. Baldwin, Desmond Beckstead,Guy Gellatly and Alice Peters (June, 2000)**

No.151 *Multinationals and the Canadian Innovation Process,* **John R. Baldwin and Petr Hanel (June, 2000)**

No.152 *Rural Youth: Stayers, Leavers and Return Migrants,* **Richard Dupuy, Francine Mayer and René Morissette (September 5, 2000)**

No.153 *Female Employment Rates and Labour Market Attachment in Rural Canada,* **Euan Phimster, Esperanza Vera Toscano, Alfons Weersink (December 2000)**

No.154 *Training as a Human Resource Strategy: The Response to Staff Shortages and Technological Change,* **John R. Baldwin and Valerie Peters (April 2001)**

No.155 *Job Tenure, Worker Mobility and the Youth Labour Market during the 1990s,* **G. Picot, A. Heisz and A. Nakamura (March 2001)**

No.156 *The Impact of International Trade on the Wages of Canadians,* **Omar Zakhilwal (December 2000)**

No.157 *The Persistent Gap: New Evidence on the Canadian Gender Wage Gap,* **Marie Drolet (December 2000)**

No.158 *In Search of Intergenerational Credit Constraints Among Canadian Men: Quantile Versus Mean Regression Tests for Binding Crefdit Constraints,* **Nathan D. Grawe (December 2000)**

No.159 *Intergenerational Influences on the Receipt of Unemployment Insurance in Canada and Sweden,* **Miles Corak, Bjorn Gustaffson and Torun Osterberg (December 2000)**

No.160 *Neighbourhood Inequality in Canadian Cities,* **John Myles, Garnett Picot and Wendy Pyper (December 13, 2000)**

No.161 **Cancelled**

No.162 *The Evolution of Job Stability in Canada: Trends and Comparisons to U.S. Results,* **Andrew Heisz (October 16, 2002)**

No.163 *The Effects of Inter-Provincial Mobility on Individuals' Earnings: Panel Model Estimates for Canada,* **Ross Finnie (October, 2001)**

No.164 Early Labour Market Outcomes of Recent Canadian University Graduates by Discipline: A Longitudinal, Cross-Cohort Analysis, ***Ross Finnie (March 2002)***

No.165 Innovation and Connectivity: The Nature of Market Linkages and Innovation Networks in Canadian Manufacturing Industries, ***John Baldwin and Alice Peters (May 2001)***

No.166 An Assessment of EI and SA Reporting in SLID, ***Constantine Kapsalis (August, 2001)***

No.167 ***Cancelled***

No.168 Enhancing Food Safety and Productivity: Technology Use in the Canadian Food Processing Industry, ***John R. Baldwin and David Sabourin (May 2002)***

No.169 Dynamics of the Canadian Manufacturing Sector in Metropolitan and Rural Regions, ***John R. Baldwin and Mark Brown with Tara Vinodrai (November 2001)***

No.170 Income Prospects of British Columbia University Graduates, ***Andrew Heisz (May 2001)***

No.171 Are the Kids All Right? Intergenerational Mobility and Child Well-being in Canada, ***Miles Corak (October 2001)***

No.172 Low-Income Intensity During the 1990s: The Role of Economic Growth, Employment Earnings and Social Transfers, ***G. Picot, R. Morissette, J. Myles (January 24, 2003)***

No.173 Impediments to Advanced Technology Adoption for Canadian Manufacturers, ***John Baldwin and Zhengxi Lin (August, 2001)***

No.174 Impact of the Adoption of Advanced Information and Communication Technologies on Firm Performance in the Canadian Manufacturing Sector, ***John R. Baldwin and David Sabourin (October, 2001)***

No.175 Skill Shortages and Advanced Technology Adoption, ***David Sabourin (September, 2001)***

No.176 Which Firms Have High Job Vacancy Rates in Canada?, ***René Morissette, Xuelin Zhang (October 25, 2001)***

No.177 A Tale of Three Cities: The Dynamics of Manufacturing in Toronto, Montreal and Vancouver, 1976-1997, ***Tara Vinodrai (November 2001)***

No.178 School Performance of the Children of Immigrants in Canada, 1994-98, ***Christopher Worswick (November 14, 2001)***

No.179 Changes in the Diversification of Canadian Manufacturing Firms (1973-1997): A Move to Specialization, ***John R. Baldwin, Desmond Beckstead and Richard Caves (February 2002)***

No.180 Differences in Interprovincial Productivity Levels, ***John R. Baldwin, Jean-Pierre Maynard, David Sabourin and Danielle Zietsma (December 2001)***

No.181 Does Parent or Child Know Best? An Assessment of Parent/Child Agreement in the Canadian National Longitudinal Survey of Children and Youth, ***Lori Curtis, Martin Dooley and Shelley Phipps*** *(October 23, 2002)*

No.182 Effects of Selection Criteria and Economic Opportunities on the Characteristics of Immigrants, ***by Abdurrahman Aydemir*** *(October 23, 2002)*

No.183 *Setting up Shop: Self-Employment Amongst Canadian College and University Graduates,* ***Ross Finnie, Christine Laporte, Maud-Catherine Rivard (March 2002)***

No.184 *Winners and Losers in the Labour Market of the 1990s,* ***Andrew Heisz, Andrew Jackson, Garnett Picot (February 2002)***

No.185 *Do Neighbourhoods Influence Long Term Labour Market Success? A Comparison of Adults who Grew Up in Different Public Housing Projects,* ***Philip Oreopoulos (June 2002)***

No.186 *Wives, Mothers and Wages: Does Timing Matter?* ***Marie Drolet (May 1, 2002)***

No.187 *The Evolution of Wealth Inequality in Canada, 1984-1999,* ***René Morissette, Xuelin Zhang and Marie Drolet (February 2002)***

No.188 *Management Experience and Diversity in an Aging Organization,* ***Ted Wannell and Martin Gravel (August 2002)***

No.189 *The Importance of Entry to Canadian Manufacturing with an Appendix on Measurement Issues,* ***John Baldwin, Desmond Beckstead and Andrée Girard (May 2002)***

No.190 *Financing Innovation in New Small Firms : Evidence From Canada,* ***John R,. Baldwin, Guy Gellatly and Valérie Gaudreault (May 2002)***

No.191 *Too Far to Go On? Distance to School and University Participation,* ***Marc Frenette (June 24, 2002)***

No.192 *Life After Welfare: The Economic Well-Being of Welfare Leavers in Canada during the 1990s,* ***Marc Frenette, Garnet Picot (March 26, 2003)***

No.193 *Plant Turnover and Productivity Growth in Canadian Manufacuturing,* ***John Baldwin, Wulong Gu (April 2, 2003)***

No.194 *Wage Progression of Less Skilled Workers in Canada: Evidence from the SLID (1993-1998),* ***Xuelin Zhang (December 6, 2002)***

No.195 *Do the Falling Earnings of Immigrants Apply to Self-Employed Immigrants?,* ***Marc Frenette (December 2002)***

No.196 *Minorities, Cognitive Skills and the Incomes of Canadians,* ***Ross Finnie and Ronald Meng (January 24, 2003)***

No.197 *The Wealth Position of Immigrant Families in Canada,* ***Xuelin Zhang (November 18, 2003)***

No.198 *The Rise in Low-Income Rates Among Immigrants in Canada,* ***Garnett Picot and Feng Hou (June 19, 2003)***

No.199 *Alternative Work Practices and Quit Rates: Methodological Issues and Empirical Evidence For Canada,* ***René Morissette and Julio Miguel Rosa (March 17, 2003)***

No.200 *Cohort Effects in Annual Earnings by Field of Study Among British Columbia University Graduates,* ***Andrew Heisz (September 26, 2003)***

No.201 *Access to College and University: Does Distance Matter?,* ***Marc Frenette (June 2003)***

No.202 *Learning From Failure: Organizational Mortality and the Resource-Based View,* ***S. Thornhill and R. Amit (August 8, 2003)***

No.203 *Effects of Business Cycles on the Labour Market Assimilation of Immigrants,* ***Abdurrahman Aydemir (July 31, 2003)***

No.204 *Visible Minority Neighbourhood Enclaves and Labour Market Outcomes of Immigrants,* ***Garnett Picot, Feng Hou (July 9, 2003)***

No.205 *Changing Trade Barriers and Canadian Firms: Survival and Exit After the Canada-U.S. Free Trade Agreement,* ***Jen Baggs (April 28, 2004)***

No.206 *Neighbourhood Attainment and Residential Segregation Among Toronto's Visible Minorities,* ***John Myles and Feng Hou (July 30, 2003)***

No.207 *Life cycle bias in the estimation of intergenerational earnings persistence,* ***Nathan Grawe (August 5, 2003)***

No.208 *Are Investment Expectations Rational?* ***by Chetan Dave (December 17, 2004)***

No.209 *Working Hours in Canada and the United States,* ***by Andrew Heisz and Sébastien LaRochelle-Côté (September 2003)***

No.210 *Family Income and Participation in Post-Secondary Education,* ***Miles Corak, Garth Lipps and John Zhao (October 1, 2003)***

No.211-214 *forthcoming*

No.215 *Will They Ever Converge?: Earnings of Immigrant and Canadian-Born Workers over the Last Two Decades,* ***Marc Frenette and René Morissette (October 8, 2003)***

No.216 *How long do people live in low-income neighbourhoods?* ***Marc Frenette Garnett Picot and Roger Sceviour (January 2004)***

No.217 *Corporate Financial Leverage in Canadian Manufacturing: Consequences for Employment and Inventories,* ***Andrew Heisz and Sébastien LaRochelle-Côté (February 2004)***

No.218 *Have Permanent Layoff Rates Increased in Canada?* ***René Morissette (March 25, 2004)***

No.219 *Rising income inequality amid the economic recovery of the 1990s: An exploration of three data sources,* ***Marc Frenette, David Green and Garnett Picot (July 9, 2004)***

No.219 *REVISED: Rising Income Inequality in the 1990s: An Exploration of Three Data Sources* ***Marc Frenette, David Green and Garnett Picot (December 16, 2004)***

No.220 *Factors Determining the Success or Failure of Canadian Establishments on Foreign Markets: A Survival Analysis Approach,* ***Jean Bosco Sabuhoro and Yvan Gervais (May 5, 2004)***

No.221 *Recent immigration and the formation of visible minority neighbourhoods in Canada's large cities,* ***Feng Hou (July 2, 2004)***

No.222 *The Deteriorating Economic Welfare of Immigrants and Possible Causes,* ***Garnett Picot (July 15, 2004)***

No.223 *The Retirement Plans and Expectations of Non-Retired Canadians Aged 45-59,* ***Grant Schellenberg (June 29, 2004)***

No.224 *Public Transit Use Among Immigrants,* ***Andrew Heisz, Grant Schellenberg (May 13, 2004)***

No.225 *Explaining the Deteriorating Entry Earnings of Canada's Immigrant Cohorts: 1966-2000,* ***by Abdurrahman Aydemir and Mikal Skuterud (May 17, 2004)***

No.226 *Family Background and Access to Post Secondary Education: What Happened over the 1990s?* , ***Ross Finnie, Christine Laporte and Eric Lascelles (August 18, 2004)***

No.227 *A Longitudinal Analysis of Earnings Change in Canada* , ***Charles M. Beach and Ross Finnie (August 20, 2004)***

No.228 *Neighbourhood Inequality, Relative Deprivation and Self-perceived Health Status,* ***Feng Hou and John Myles (September 27, 2004)***

No.229 *Population Movement Into and Out of Canada's Immigrant Gateway Cities: A Comparative Study of Toronto, Montreal and Vancouver,* ***Feng Hou and Larry S. Bourne (September 13, 2004)***

No.230 *Earnings of Couples with High and Low Levels of Education, 1980-2000,* ***René Morissette et Anick Johnson (October 13, 2004)***

No.231 *Welfare Dynamics in Canada: The Role of Individual Attributes and Economic-Policy Variables,* ***Ross Finnie, Ian Irvine and Roger Sceviour (October 2004)***

No.232 *Relative Wage Patterns among the Highly Educated in a Knowledge-based Economy,* ***René Morissette, Yuri Ostrovsky and Garnett Picot (September 29, 2004)***

No.233 *Postsecondary Field of Study and the Canadian Labour Market Outcomes of Immigrants and Non-Immigrants,* ***Arthur Sweetman and Stephan McBride (October 28, 2004)***

No.234 *Immigrant Source Country Educational Quality and Canadian Labour Market Outcomes,* ***Arthur Sweetman (December 15, 2004).***

No.235 *The Evolution of the Gender Earnings Gap Amongst Canadian University Graduates,* ***Ross Finnie and Ted Wannell (November 30, 2004)***

No.236 *forthcoming*

No.237 *Who Goes? The Direct and Indirect Effects of Family Background on Access to Post-secondary Education,* ***Ross Finnie, Eric Lascelles and Arthur Sweetman (January 18, 2005)***